THE ENGINEERING AND MINING JOURNAL AND COAL

Entered at the Post-Office of New York, N. Y., as Second-Class Matter.

VOL. XXXVII. JANUARY 19, 1884. No. 3.

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SUBSCRIPTION PRICE, including postage, for the United States and Canada, $4 per annum; $2.25 for six months; all other countries, including postage, $5.50 = 22s. = 28 francs = 22 marks. All payments must be made in advance.

FILE COVERS will be sent by mail for $1.25 or delivered at office for $1 each.

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THE SCIENTIFIC PUBLISHING CO., Publishers.

R. P. ROTHWELL, Pres. HENRY M. GEER, Sec. and General Manager,
P.O. Box 1833. 27 Park Place, New York.

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ONE of the mine inspectors of the anthracite regions is credited in an associated press dispatch with the statement that at an early date the consumption of anthracite in the Northwest would be as great as that of the entire New York and Eastern markets. We have noted repeatedly of late that irresponsible statements of this kind referring to the coal and iron interests of the country have been rushed into notoriety by probably well-meaning but decidedly misguided persons. This method of "booming" does more harm than good, and will react upon the trades in question. Those engaged in it smile at the absurdity of such efforts, but less well-informed people are likely to be misled.

THE *Ironmonger* is slightly disconcerted at the fact that contracts have been made by some of the promoters of Transvaal gold properties with American firms for the machinery to be used in treating their gold ore. It pathetically asks how it is that the necessary machinery can not be procured in England or Scotland, and recommends to the British engineering firms to lose no time in adapting themselves to the wants of the day. That our mills are vastly superior to any thing English mining machinery firms can turn out, is, we believe, beyond all question. We need only point to the success of American stamp-mills in Venezuela, Colombia, Honduras, and in other States in Central and South America. English engineers would, however, find that it takes more than mere copying to attain their excellence. Every detail is the result of long experience, and our friends across the Atlantic would rapidly go through the usual fate of imitators, that of failure.

AN esteemed correspondent, who is anxious to preserve the reputation of the ENGINEERING AND MINING JOURNAL for mathematical accuracy of statement, calls our attention to the following paragraph of an editorial in our issue of January 5th: "He (Dr. DROWN) called a special meeting, explained the situation, and offered his resignation," etc., etc. And he thinks that this wording "leads to the interpretation that Dr. DROWN called a special meeting *to consider his resignation*." Our correspondent informs us that the notice calling this special meeting read as follows: ". . . The object of the meeting is to consider the desirability of extending an invitation to the British Iron and Steel Institute to hold a meeting in this country during the year 1884, and for other matters of general business that may arise." If any other reader of the editorial in question was led by our loose wording to the erroneous conclusion suggested above, we beg he will immediately correct his "interpretation" in accordance with the fuller information given by our conscientious and much esteemed correspondent.

REVIEW OF THE IRON MARKETS IN 1883.

A glance at the table of quotations for pig-iron, rails, and old material which we print elsewhere is an eloquent epitome of the history of the iron trade in this country during the year 1883. It was a constant struggle of eager sellers against a shrinking demand and reluctant buyers. From time to time, confidence was shocked by the report of embarrassments of leading producers. During the first months of the year, the trade was agitated by the tariff discussion; and hardly had that question been settled by the passage of the new tariff bill, when, after a few months of peace, the same disquieting element is again looming up.

The leading feature has undoubtedly been the falling off in the demand, accompanied, or rather intensified, by a steady reduction of stocks of raw and finished material in consumers' hands, with which the decline in the stocks of producers has not fully kept pace. This means, of course, practically the accumulation of a reserve of orders, which at the first sign of an improvement will hasten the process toward recovery. This depletion of stocks in buyers' hands causes increased weakness while it is going on; but, on the other hand, it is an element of strength at the first serious turn of the market. Before the famous and much regretted "boom" period, it had reached a degree that was largely responsible for the starting of the undue inflation, and it is only proper to say that it has not now progressed by any means so far as to threaten a repetition of the former experience, even if the other leading causes should happen to co-operate, as there is no prospect that they will. In a trade so diversified, and pouring its products into so many channels, it is practically impossible to gauge consumption, except in a very general way. The best customers of the iron trade are the railroads, and with certain restrictions, the new mileage constructed furnishes an indication of the magnitude of their purchases as compared with previous years. The demand for equipment, rolling-stock, and permanent way for new roads is only a part of the entire consumption, and the quantities called for for renewal are not necessarily proportionately large in periods of activity in extending existing mileage. These quantities do fluctuate more widely than is probably generally believed, and requirements are often held back for years during periods of dullness. With this reservation, the fact that 6200 miles, approximately, of new road were built in 1883, against nearly 10,000 miles in 1882, must be considered. It must be also taken into account that the orders for materials for new mileage are generally placed many months before the railroad for which they were contracted appears in the returns of completed road. A large part of the work done for the new mileage of 1883 was probably in reality on the order-books of the mills in 1882, and the falling-off in the demand from the railroads during the past six months confirms the impression gained from the doings in financial centers, that next year will witness a further heavy falling-off in the mileage. There are very few projects, comparatively speaking, and so far as the demand for railroad construction is concerned, it appears only too likely to result in further disappointment.

Production, according to that excellent authority, Mr. James M.

MONTHS.	AMERICAN PIG-IRON.			SCOTCH PIG-IRON.			RAILS.		WROUGHT.
	No. 1.	No. 2.	Forge.	Coltness.	Eglinton.	Glengarnock	Steel.	Old Ts.	Scrap.
January	$24½@$26½	$22½@$23½	$20½@$21	$25 @$26½	$21 @$21½	$22 @$23	$40 @	$23 @$25½	$24½@$26½
February	22½@ 25	20½@ 23½	20 @ 21	24½@ 25½	21 @ 21½	22 @ 23	38 @$40	24½@ 25	24½@ 25½
March	22½@ 25	21½@ 22½	19 @ 20½	24¼@ 25¼	21 @ 21½	22 @ 22½	39 @ 40	23½@ 24¾	24 @ 25¼
April	21½@ 24½	19½@ 22½	18½@ 20	24 @ 24½	21 @ 21½	22 @ 22½	38 @ 39	23½@ 24½	25 @ .....
May	21 @ 22½	19 @ 20½	17½@ 19	24 @ 24½	21 @ 21½	22 @ 22½	38 @	22 @ 24	23½@ 25
June	20 @ 23	18 @ 20	17½@ 19½	24 @ 24½	21 @	22 @ 22½	37 @ 38	21 @ 23	22½@ 24
July	21 @ 23½	19 @ 20½	18 @ 20	23½@ 24	20½@ 21½	22 @	38 @ 39	21 @ 22	21½@ 22½
August	21½@ 23½	19 @ 21	18 @ 20	23¾@ 24	20½@ 21	22½@ 23	37½@ 38½	21½@ 23½	22½@ 23
September	21½@ 23	19 @ 21	18 @ 20	23¼@ 24	20 @ 21	22 @ 23	37 @ 37½	22¼@ 24	22 @ 23½
October	20½@ 22½	19 @ 20½	18 @ 19½	22¾@ 23¼	20 @ 21	22 @ 22½	36½@ 37½	21 @ 23	22 @ 23¾
November	20 @ 22½	18½@ 20	17 @ 18½	23 @	20 @ 21	21¾@ 22	35 @ 36	20¾@ 23	23 @ .....
December	20 @ 22½	18½@ 19½	17 @ 19	22 @ 23	20 @ 21	21½@ 22	35 @ 36	22 @ 23	.....

Swank, Secretary of the Iron and Steel Association, has on the whole come very near the average of the preceding year.

So far as the other source of supply, our imports from foreign countries, is concerned, it has on the whole shown a gratifying tendency to become less important. As yet, the figures for the year are not available; but we do possess the following returns from the Bureau of Statistics for the past ten months of the year, which will serve well to show the decline in many important branches:

IMPORTS OF IRON AND STEEL FOR THE FIRST TEN MONTHS.

	Quantities.		Values.	
	1883.	1882.	1883.	1882.
Iron ore, gross tons	432 395	514,457	$1,080,713	$1,426,798
Pig-iron, " "	263,994	464,432	4,734,587	8,622,667
Wrought and cast scrap, gross tons	48,890	131,425	779,796	2,464,911
Bar-iron, net tons	40,358	68,755	1,618,583	2,870,311
Iron rails, gross tons	426	36,331	13,310	1,040,411
Steel rails, " "	33,638	145,694	1,029,257	4,843,778
Hoop, band, and scroll, net tons	989	5,146	38,803	176,524
Sheet, plate, and taggers, net tons	8,459	11,268	640,749	712,056
Tin plates, net tons	212,406	202,425	15,594,463	15,325,390
Cutlery	.....	.....	1,781,218	1,728,220
Fire-arms	.....	.....	1,070,437	1,404,966
Machinery	.....	.....	1,458,181	1,935,528

There has been some change in the classification of a number of articles of iron and steel, including cotton ties, hoops, steel ingots, wire rods, anvils, axles, and forgings and chains. Formerly, the quantities were not specified, and it is possible to compare only the values of the whole series for the first ten months of 1883 and 1882, which were $12,617,254 and $16,915,486 respectively. We note with pleasure that the quantities of such imports as cotton ties and wire rods are given; and to show the magnitude of the latter business, we may note that in October of this year 6594 tons of wire rods were imported, in spite of the dullness of the business.

One of the prominent features of the year has been the rapid growth of the use of steel for structural and a variety of other purposes, and it is now freely offered at the same price as iron.

American Pig-Iron.—The year opened with considerable weakness, and continued unsettled during the first month, less well-known brands particularly being forced upon the market at concessions which, in some cases, were very large. Besides, the tariff agitation had a good deal to do with keeping buyers from covering more than the most urgent necessities, and the market gradually sank away. A feeling of hesitation characterized the first weeks of February, and it was only after more important concessions had been made that there was a little more activity. Standard brands, it is true, were stubbornly held, so that, so far as they were concerned, there was practically a dead-lock, which resulted in the accumulation of stocks, particularly in Eastern Pennsylvania. During the first two months, the sales of Forge grade were heavy. These conditions, so long continued, had ultimately their effect upon the markets, and even after the beginning of March, when the tariff issue had disappeared, it was found impossible to tempt buyers to enter into season contracts without a reduction in prices. It was therefore decided to put down standard brands of No. 1 to $24, and No. 2 to $22. Even this, however, had no effect. The demand proved a disappointment and the few signs of activity following immediately upon the announcement of the reduction disappeared and gave way to general apathy. Again there were numerous reports of the irregularity of quotations of outside brands, which were forced upon the market.

April began with stocks increasing and a general stagnation. In the third week of the month, the Thomas Iron Company, evidently with the object of forcing out those who were weak, put down its figures to $22 and $20 respectively; but even this did not stimulate buyers, who were holding off in the hope that even unfavorably located furnaces would not give up without a sharp struggle.

In May, there was considerable talk of blowing out furnaces, and there was really a reduction in the number of those producing. The reports of the failure of the Allentown Iron Company, however, created an excitement which seemed to dispel the hope that the bottom had been reached.

In June, reports of cutting grew more and more numerous, and finally led to an open reduction to $19 and $20 respectively, at which figures pretty heavy sales were concluded, and a somewhat firmer feeling began to prevail. It became obvious that the stocks of No. 1 had been pretty thoroughly cleared away, and prices were, therefore, toward the end of the month, advanced again to former figures, so far as the best grades were concerned.

For the time being in July, it was hoped that the improvement might extend to the lower grades; but the conviction appeared to be gaining ground that only an extraordinary demand could hold prices. The statement of production and stocks, and of furnaces in and out of blast, compiled by Mr. Swank, was not calculated to furnish very strong bull arguments; while, on the other hand, it did not offer much encouragement to violent bears. Still, August opened with signs of weakness, due primarily to dullness, and also to a more ample supply of other grades than No. 1. Buyers continued to follow their hand-to-mouth policy, and September opened with the feeling that, although a number of furnaces had gone out of blast, production was still too heavy. It is true that there was not much shading, because it was believed that lower prices would not tempt the buyers, and because the busiest season of the year was near at hand. Holders were evidently disposed to take their chances as to the magnitude of the fall trade; but September proved a severe disappointment, very few season contracts being entered into. Strenuous efforts were made by furnace-men to reduce the cost of production by procuring lower-priced fuel, but apparently without success; and when November showed no signs of a revival, a further reduction was ordered, prices coming down to $20.50 and $19.50. To a limited extent, this had the desired effect of bringing out buyers, and November opened with some hopes of an improvement, it being noticed that consumers generally insisted upon prompt delivery. This was confirmed during December, which, though a very quiet month, passed without any signs of weakness.

Scotch Pig-Iron.—The business in Scotch foundry pig has dwindled down to small proportions. During the year, there has been very little or no speculative interest in it, and outsiders have long ago dropped it. Importers are simply filling a demand that has legitimately grown up for it, as part of the mixture for which their customers have learned to employ it. *Iron* says of the Glasgow market: "In Scotland, what adds to the disappointment that the year has been so unsatisfactory in its results is, that all through, in every department of the iron trade, there has been full employment, and seldom has a heavier amount of work been turned out of our shipbuilding yards, engineering shops, foundries, and iron-works, and yet, greatly owing to the competition of other iron centers, the prices realized have not been profitable, and the complaint has been general that the manufacturers have not been making money. In regard to shipbuilding, it is stated that the cream of the year's profits have been obtained by certain classes of workmen who could make almost fabulous wages, and who, besides their over-pay, caused serious loss through their irregularity and waste of time. The pig-iron warrant market, which may be taken as a fair index of the state of trade in this district, and to a less extent of the state of trade over the commercial world, has been dull, with gradually declining prices, and we close the year at a price which has rarely been touched, and that only in years of serious depression. For the most part of the time, the public has to an unusual extent refrained from either speculating or investing in warrants, and the market has been left to the control of the jobbers and brokers, who, being chiefly 'bears,' have added the weight of their influence to the downward tendency of prices.

"The production of pig-iron in 1883, as given by the iron-masters, is 1,129,024 tons, an increase on the previous year of 2679 tons. The stock in makers' hands is 250,862 tons; in Connal's store, 584,138 tons; the decrease in stock for the year being only 1000 tons. The foreign shipments for the year are 415,612 tons; coastwise, 204,045 tons; forwarded by rail to England, 27,343 tons; in all, 647,000 tons, against 645,000 tons last year. During 1883, the average number of furnaces in blast was 110, against 108 in 1882, and there are now 103 furnaces in blast, against 112 on December 31st, 1882. The shipbuilders on the Clyde have never launched a heavier tonnage than during the present year, the gross amount being 419,664 tons, against 392,866 tons in 1882. Wages have been high and full employment given, but latterly few new orders have been booked, and a number of the yards are beginning to have a deserted appearance, while over 5000 men have been thrown out of employment. The malleable works and foundries have been in full operation, and have consumed 483,000 tons, against 585,000 tons in 1882. Competition for orders has been very keen, as old works have been enlarged and new works put in operation, with more in progress."

Of the Cleveland District, the same authority says:

"With regard to the make of Cleveland and other kinds of iron, there is an increase of something like 3 per cent over that of the previous year, notwithstanding the restriction policy of the iron-masters, which, however, was of a milder character in 1883, and may be said to have practically ceased altogether since September or thereabouts. This restriction, so-called, has been humorously termed a restriction to increase the make, as it generally simply meant laying off the furnace from Cleveland and laying it on to iron other than Cleveland. The make of 1883 will be found to be close on 2,766,000 tons, as against 2,688,650 in 1882. The increase is mainly in Cleveland iron, the make of 1882 being 1,772,239 tons, and that of 1883 being close upon 1,850,000. The make of iron other than Cleveland, namely, hematite, spiegel, and basic, is much about the same, that of 1882 amounting to 916,411 tons. The increase of some 80,000 tons, though favorable, seeing it has been brought about in the face of restriction, and with much the same number of furnaces blowing, can hardly be accounted for, as some are inclined to think, by improved furnace practice, although undoubtedly that may be a material influence. The disposal of this make has been satisfactory enough so far as getting quit of it is concerned, and had prices been as satisfactory, there would have been no room for grumbling, but, contrary to the general rule, stocks and prices fell together."

Steel Rails.—A falling off in the consumption, with a constant danger of overproduction, has made the year 1883 one long struggle against a declining market, for which the only compensation has been a corresponding decrease in the price of Bessemer pig, and toward the end of the year a reduction of wages. In spite of the fact that a number of mills have been closed down at odd times during the year, the competition for orders has been very sharp throughout. The low prices

ruling have practically caused the cessation of rolling imported steel blooms, and have put an end to the manufacture of iron rails except for some special purposes.

With the new year opened the fight for the winter and early spring work, and some of the mills claimed to have their capacity engaged till July. Similar statements were so frequently repeated during the year by those who had always some corner to fill up and were anxious to do it at round concessions that faith in such professions to some extent disappeared. Still, January passed by without any special features, only occasionally sales of small lots being reported. In February, the failure of the Union Works was announced, and simultaneously, though not in consequence of it, the market weakened, and, after a brief period of irregularity, declined squarely to $39. March witnessed round sales at these figures, but the eagerness of sellers to get in summer work carried the price down to $38. Nominally, this figure was upheld in April, but it is likely that some of the large lots then placed were taken at a concession. A large part of the business done was for fall delivery, and May was largely devoted to picking up the odds and ends. In June, prices weakened all around, and $37.50 became the nominal figure, though it was generally understood that even earlier contracts had been closed at that price. Bids in the beginning of July for fall and winter work did not go higher than $36.50. Though some show of resistance was made, and prompt delivery small lots fetched $38@$38.50 during the greater part of August, and $37.50 in the beginning of September, the first signs of a struggle carried prices downward to near that point in the closing days of September. The contest fairly began for winter and spring work in October, and $36.50 became the recognized quotation. In the first days of November, an open cut to $35 was made. Heavy orders were placed at this figure, which it was rumored was even shaded in some instances. However much truth there may have been in these statements, for a time the market was tolerably firm, until, in the beginning of December, it became known that the efforts of a new-comer in the Chicago market had led to a fight, in the course of which rails were sold in large lots at prices equivalent to $32.50 at Pennsylvania mill. This did not ultimately remain without its effect on the East, where, during December, rails were sold at $34, and later at $32.75 at mill, although the year closed with the market tolerably firm at $34@$35.

THE ANTHRACITE AND BITUMINOUS COAL TRADE DURING THE YEAR 1883.

Buffalo.—The mines tributary to the Buffalo market began business with a fair demand, the best grades of steam coal selling before the beginning of navigation at $3@$3.25 per gross ton, free on board; but in May, prices weakened, buyers holding off until the supply was more than ample. At this time, the New York Central closed a contract for the year's supply for its Western division, taking Reynoldsville coal, run of mine, at $2.30 per ton. June opened dull, with the output in excess of the demand, with prices at a low figure, and heavy stocks pressing on the market. In July, Buffalo firms took a contract for the delivery of 50,000 tons of coal for the Canadian Pacific, to be delivered at Thunder Bay and Prince Arthur's Landing; and 30,000 tons for the Northern & Northwestern of Canada, screened lump, delivered at International Bridge, for $2.15. On the 18th, the announcement was made that Long Run, Bostonia, and Kittanning coal would be sold on track of the Buffalo, New York & Philadelphia Railroad at $2.30 for screened lump, $2.20 for lump and nut, $2.10 run of mine, and $1.50 slack, figures which were soon after withdrawn. In the first days of August, the Rochester & Pittsburg Railroad made its first shipments of bituminous coal to the Buffalo market. The company owns two mines at Walston and Beech Tree, its principal business, however, being the carrying of coal from the Du Bois mines. During August and September, the trade gradually improved, and in the beginning of October had reached the point that there were no heavy stocks pressing on the market, though the supply was ample to fill the requirements, a state of affairs largely due to a strike in the Reynoldsville, Fairmount, and Rochester & Pittsburg Company's mines. Though these troubles continued for weeks, they did not sensibly affect the trade or create the "coal famine" which the miners had depended upon to help them in carrying their point.

Chicago.—The year 1883 began with a very dull market in bituminous coal in Chicago, due partly to the depression in the iron trade and partly to troubles about freight, as in the case of Indiana coals. Quotations were $5.50@$6 for Erie and Brier Hill, $4 for Hocking Valley, $3.40 for Indiana Block, $3 for Wilmington, $2.50@$2.75 for Minonk, Grape Creek, Streator, and Morris, and $4 for Kinkaid lump. In spite of the falling off in the demand, the market remained tolerably firm during the first two months—a state of affairs due largely to the fact that the severity of the winter hampered the movement of supplies. In the beginning of March, there was a strike in the Brazil and Carbon, Ind., districts, which was ended after a struggle of a few weeks by the miners yielding. Prices, except for Indiana Block, which fell to $3 in May, fairly held their own, the production keeping pace with the slight fluctuations in the demand. A two weeks' strike at the Streator mines, the largest in Illinois, and only seventy-five miles from Chicago, was settled by the acceptance of a reduction on the part of the miners. Toward the close of May, railroad freights had been quite generally arranged for the coming season, and a number of large contracts were consequently promptly closed, at generally very low prices. In June, Erie and Brier Hill were nominally quoted $5; Indiana Block, $2.80@$2.90; Hocking Valley, $3.30@$3.50; Wilmington, $2.50@$2.75; and Streator, $2.40@$2.50. The volume of business during this and the succeeding month was fair, though values did not show any improvement. On the contrary, in the case of Brier Hill, there was a falling off to $4.50, in consequence of a reduction in the freight rates. July opened with prices lower still, Wilmington having receded to $2.40@$2.50; Kinkaid lump to $3.40@$3.50; and Grape Creek to $2.25@$2.30. In the beginning of September, an increased demand from the Northwest, particularly for Indiana coals, caused an advance in Block to $3, and in Fountain County, Ind., coals to $2.40 per ton. The Hocking Valley operators soon followed, demanding an advance to $3.50, in consequence of an increase in the price of mining. On October 1st, the miners in the Indiana District went out on a strike for $1 per ton for mining, and similar troubles disturbed the Mahoning and Shenango valleys in Ohio. The former soon gained their point, and their example was imitated by the Illinois miners, notably in the Wilmington District. The result was quite a general advance. In November, the labor disputes were quite generally settled, and quotations had rallied to $5.25 for Erie and Brier Hill, $3.25 for Indiana Block, $3.50@$3.75 for Hocking Valley, $2.60@$2.75 for Wilmington, $3.40@$3.50 for Kinkaid lump, $2.35@$2.50 for Fountain County, $2.30 for Clinton, and $2.50 for Streator. The demand during the month for all standard coals was good, and in some cases encouraged attempts at advances. With December, however, the tide of affairs took a turn, and in the middle of the month the competition between the shippers of Hocking Valley coal culminated in a fight, which temporarily drove the prices down from $3.75 to $3.15. The year was one of heavy shipments, a moderate demand, and keen competition. The following figures will give a good idea of the magnitude of the bituminous coal trade in Chicago:

RECEIPTS OF BITUMINOUS COAL IN CHICAGO FOR 1883.

	By rail.	By lake.
January	285,545	696
February	229,908	.....
March	241,215	.....
April	206,857	.....
May	225,327	25,191
June	164,522	32,911
July	177,422	38,930
August	209,115	33,205
September	197,225	21,947
October	176,216	22,359
November	273,427	31,717
December	245,137	4,600
Total	2,631,916	211,556
Receipts of bituminous, 1883		2,843,472
" " anthracite, "		1,241,322

Cleveland.—The year opened quiet and dull, with prices ranging as follows: Carbon Hill and Monday Creek, $2.30@$2.40; Brier Hill, lump, $3.35@$3.45; Goshen, $2.30@$2.40; Massillon, $2.65@$2.75; and $2.15@$2.25 for Salineville and Tuscarawas. As the season advanced, no marked improvement came, and coal strikes at different mines tributary to Cleveland became more frequent, the operators seeking relief by a reduction in wages. In April, f. o. b. prices were as follows; Brier Hill, $3.25@$3.50; Hocking Valley, $2.25@$2.50; Pittsburg, $2.85@$3; Youghiogheny, $3.10@$3.25; Massillon, $2.75@$2.85; and Tuscarawas, $2.15@$2.30. At these figures, the lake trade opened fairly well, an amount of coal fully equal to the previous year being contracted for. At some points—for instance, Detroit—there was a sharp struggle, leading to low prices, and in some cases coal was sold at lake ports as low as $2 per ton, f. o. b. After the first rush of activity, the trade at lake ports settled down to dullness. The depressed condition of the iron trade had its strong effect upon the coal interests of Ohio, the local consumption for this industry being restricted. June and July thus passed by quietly, with pretty heavy shipments, but, on the whole, very small profits, the low figures at which the season opened ruling throughout that time. In the beginning of October, a general advance of 10 cents per ton for mining was granted to the men; though only in many cases after the persuasion of a strike. The mines were producing more actively than hitherto, stimulated by a good demand and slightly better prices. The cessation of lake shipments in November was compensated for by the setting in of the domestic trade; but as the season progressed without bringing prolonged cold weather, the trade relapsed into dullness, relieved toward the close of the year by occasional periods of activity.

During the year 1883, the shipments of coal, by lake, from Cleveland were 754,891 tons coastwise and 270,235 to Canada; from Ashtabula, 137,856 tons; from Lorain, 38,610 tons, coastwise.

NEW PUBLICATIONS.

A GLOSSARY OF TERMS USED IN COAL MINING. *By* WILLIAM STUKELEY GRESLEY, *Assoc. Mem. Inst. C.E., F.G.S., Mem. N. of E. Inst. of M.E., etc.* Illustrated with numerous Wood-Cuts and Diagrams. London and New York: E. & F. N. Spon. 1883. 12mo, 296 pages.

This is the best glossary of British coal mining terms which we have encountered. The definitions are in the main clear and correct, and the cuts inserted in the text contribute greatly to the understanding of such explanations as might otherwise be obscure. Words and phrases peculiar to certain localities are followed by abbreviated indications of their local usage. In all these particulars, the book is well arranged and well executed, as also in its typography. The attempt to increase its value by including in it American and European terms is a failure, if that can be called a failure which has scarcely been seriously attempted. Mr. Gresley's list of authorities consulted contains nothing but British books. In looking through these, he appears to have fallen here and there upon foreign terms, which he has clapped into his glossary, without seeking to make the list of such terms in any way complete, and often, as we are compelled to believe, without knowing much about them. The result has been to injure rather than enhance the value of the book; and the non-British reader should be cautioned not to judge it by this, its weakest side.

We find, for instance, that a *Breaker-boy* (Pa.) is "a lad who attends to a coal-breaking machine." Of the various sizes of anthracite, we find *Egg* and *Buckwheat* only mentioned, while the terms *Steamboat, Broken, Grate, Stove,* and *Chestnut* are missing. *Lumps* is given as from South Staffordshire, and as meaning "coal of largest size by one"—whatever that may mean; and *Peas* is defined as we would define *Pea-coal*. Under *Lift*, we are surprised to find, as the Pennsylvania meaning, "A block of coal measuring three quarters of a mile on the *strike* by 1000 yards to the *rise*." We can assure Mr. Gresley that there are no such lifts in Pennsylvania mines. He gives, as the tenth definition of this word, however, the meaning accepted in Pennsylvania; but he falls into a curious error, in referring to the word *Relevée* as the *Prussian* equivalent! Under *Run*, a Pennsylvania usage is but imperfectly stated, the definition being, "The sliding and crushing of pillars of coal, producing *falls* of *roof*."

Apparently Mr. Gresley knows nothing of the way in which the run is utilized in working breasts.

The German terms are few, and this is fortunate; for they are not intelligently used or explained. *Oberbergamt* is defined in ignorance of the most important functions of such a department; *Revierbeamter* has its last syllable cut off, so as to rhyme respectfully with the superior authority; *Steiger* is given as synonymous with *Fireman;* and, most astonishing of all, we are told under *Vorhauer* that "this word means 'old man of the stall'"!

But, as we have remarked, it would be a mistake to judge this book by such examples. For the explanation of American or European terms, we do not recommend it. For terms employed in Great Britain, it is much better than its predecessors, though it might still be improved. Mr. Gresley intimates an intention of enlarging and perfecting it in later editions. We hope he will also revise it carefully, and remove from it some obscurities and infelicities of style which linger in it, here and there, and betray the varied origin of his materials. If he will try to parse the main sentence in his definition of the *Mueseler Lamp*, he will find an illustration of what we refer to. We notice that the word *Adamant*, given as peculiar to North Wales, has no definition at all. Such blemishes are doubtless due to the scissors; but they ought to be corrected by the pen. Of serious errors in the British terms, we have noticed none, except the definition of *Bulkhead*, which is made synonymous with *Chock*. We should be greatly surprised if this proved to be the meaning of bulkhead in any coal-mining district. Everywhere, so far as we know, a bulkhead is a partition or stopping, to prevent the passage of air, water, etc., or to keep out human intruders. But a *chock* or *crib* or *nogs* denotes merely a support to the roof, built up with blocks or logs as children build cob-houses, and not necessarily or usually constituting a bulkhead at all, or having the effect of one. This is the only point we have noticed, on which we seriously differ with Mr. Gresley. We might raise many small questions—for instance, whether it is true, as he says, that shafts are "usually circular;" whether it belongs to the definition of a *trap-door* that it should be "kept locked," etc.; but to multiply these minor criticisms would be to give a less favorable impression concerning the book than we sincerely desire to give. It is far from perfect, in a literary way; but it is superior to most other English mining glossaries, and will prove a valuable aid in the perusal of British journals, transactions, and reports on colliery matters. For this purpose, we think it better than Raymond's, which covers metal-mining and metallurgy and gives American usages, but is less abundant in the local British terms. *

TECHNOLOGICAL DICTIONARY IN THE ENGLISH AND GERMAN LANGUAGES, *containing the Terms and Locutions Employed in Architecture, Civil, Military, and Hydraulic; Ship-Building; Construction of Railways, Roads, and Bridges; Mechanics; Machine- and Engine-Making; Technology; Arts; Trades and Manufactures; Agriculture; Commerce and Navigation; Mining and Metallurgy; Artillery; Physics; Chemistry; Mathematics; Astronomy; Mineralogy; Botany, etc. Edited by* GUSTAV EGER, *Professor of the Polytechnic School of Darmstadt, and Sworn Translator of the Grand-Ducal Ministerial Departments, in connection with* P. R. BEDSON, O. BRANDES, M. BRÜTT, CHARLES A. BURGHARDT, TH. CARNELLY, J. J. HUMMEL, J. G. LUNGE, J. LÜROTH, G. SCHÄFFER, W. H. M. WARD, *and* W. CARLETON WILLIAMS. *In Two Parts.* FIRST PART: ENGLISH-GERMAN. *Technically Revised and Enlarged by* OTTO BRANDES, *Chemist.* Brunswick: Frederick Vieweg & Son. 1882. Octavo, 711 pages. For sale in New York by B. Westermann & Co.

This elaborate work, issued in the handsome and correct typography for which the house of Vieweg is famous, and printed, we are glad to say (Prince Bismarck to the contrary notwithstanding), in Latin letters, contains, according to our rough estimate, at least 75,000 translations of English technical words and phrases into their German equivalents. Of the gentlemen named upon the title-page as *collaborateurs*, Dr. Bedson, Dr. Carnelly, and Mr. Williams are connected with Owen's College, Manchester. The first has had in this work the departments of mining and metallurgy; the second, those of botany and palæontology; the last, those of agriculture, forestry, and zoölogy. Dr. Burghardt, of Victoria College, Manchester, has labored in mineralogy and geology; Professor Hummel, of Leeds, in mechanical technology and trades; Mr. Schäffer, an engineer of Newcastle-upon-Tyne, in engineering, shipbuilding, and machine construction; and Mr. Ward, an architect of Manchester, in architecture, decoration, and art history. This list of the English editors, or German editors resident in England, indicates, what an inspection of the dictionary confirms, that the English terms have been intelligently selected from current literature and actual practice, by those who have had opportunity to become familiar with them. On the other hand, the editors in Germany are equally well qualified. Dr. Brütt, of Hamburg (commerce and marine); Dr. Lunge, of the famous Zurich Polytechnicum (chemistry, chemical technology, physics, electro-technics, railroads, and transportation); Dr. Lüroth, of the Technical Academy at Munich (mathematics, astronomy, and geodesy); and Professor Eger and Mr. Brandes, the principal editors, constitute what is colloquially termed "a strong team."

The immense extension, in recent years, of scientific and technical nomenclatures, and the great increase of international communication in such matters, render such dictionaries as this necessary to a larger number of students than ever before. Ordinary English-German and German-English dictionaries do not meet the case. They do not contain the terms sought, and they can not be relied upon for accurate meanings or synonyms. Even technical dictionaries go out of date very rapidly; and those which were very good a few years ago are a blank in many whole departments of science, art, and trade which have come into being since their publication. Moreover, small and cheap works, of which there are a number, of varying degrees of merit, are not adequate to the demands of the student. A large dictionary prepared by a considerable number of experts and representing present literature and practice, is the thing wanted; and this we find in the volume before us. Whether the second part—the German-English, which we believe has not yet appeared—is edited by the same hands, we do not know. If so, however, we shall be prepared to find it less satisfactory than the part before us; though this apprehension is founded on a prejudice, perhaps, to the effect that a body of editors exactly suited to do such work in one direction would not be as well suited to the converse operation. We will, however, not criticise in advance what we have not seen; and meanwhile, we have every reason to be pleased with what we have seen. We may, in this connection, express our satisfaction that this work does not attempt to cover French terms as well as English and German. The highest excellence is not to be reached in such undertakings by doing too much at once. An English-French and French-English technical dictionary ought to be made by a special corps of editors, as this one has been made; and the German and French require another separate work.

To return to this volume. We have examined it with a good deal of care, directing our attention chiefly to mining and metallurgical terms, and we have found it remarkably full and accurate. Peculiarly American terms, indeed, are not thoroughly represented. For instance, the variety of nozzle used in hydraulic mining and called the Monitor, happens to be given; but the Little Giant is not given; nor are other appurtenances of hydraulic mining, such as the grizzly, mentioned. But we must expect these deficiencies in books made across the water; and as we have often had occasion to point out, they are less important to American than to foreign students. In an English-German dictionary like this, the absence of peculiar American terms for which the Germans have no synonyms need not trouble us at all. What special benefit should we get from being told that the German for *Grizzly* is *der Grizzly?*

Among the numerous mining definitions which we have examined in this work, we have found but two or three which seem to us erroneous. *Bench-coal* is translated *die oberste Schicht eines Steinkohlen-lagers* (the uppermost layer of a coal-bed), which is a strange limitation, to our thinking. We had supposed that a "bench" in a coal-bed might be upper, lower, middle, etc., according to its position and the number of partings in the bed. And the definition of *Bench-floor* is still more surprising: *die sechste Schicht der Steinkohlen-lager* (the sixth layer of the coal-beds). This we do not understand at all.

We find *Stope* defined as *die Strosse*, and *Stoping* as *der Strossenbau*. It is true that the primitive meaning of *Strosse* is a step or bank, and this is also the primitive meaning of *Stope*. But certainly *Strossenbau* is but one kind of stoping, to wit, underhand stoping, overhand stoping being *Firstenbau*. The general synonym for *Stoping* is *Abbau*, although this term includes some operations to which we would not apply *Stoping*. The Germans, for instance, speak of the *Abbau* of coal. Probably the fairest English equivalent for *Abbau* is *Winning;* yet this term, which might be used with propriety in metal mining, is actually, as it happens, confined to coal mining. In short, exact synonyms, agreeing both in meaning and in usage, are not easily found, even in languages so closely related as German and English, or in arts like the art of mining, a large part of the language of which went from Germany to England in the first place.

The mechanical, chemical, mathematical, and general scientific departments present, we think, fewer difficulties than do the practical arts, to the dictionary-maker. Since in the latter the work before us exhibits a high degree of excellence, we are led *a fortiori* to expect the same in the former. And in this we are not disappointed. The fullness and clearness of the scientific nomenclature and the accuracy of its translation leave nothing to be desired.

We notice with pleasure, as a minor but not insignificant detail, the general avoidance of cross-references. To tell the student, when he has laboriously found the word he wants, to "see" something else, is an irritating kind of economy; and though it is often necessary to save room in that way, the saving ought to be considerable if it is to counterbalance the annoyance. The *beau ideal* of a dictionary is one in which we find what we seek *the first time of looking.* This principle has been kept in mind by Professor Eger, and we have to thank him for the degree to which he has succeeded in conforming to it. *

MR. JOHN GRIFFEN, Superintendent of the Phœnix Iron Company, died at his residence in Phœnixville, Pa., January 14th, aged seventy-two years. Mr. Griffen was born in Mamaroneck, Westchester County, N. Y., in the year 1812. In less than a year after his birth, his father died. After finishing his education, he entered the mercantile establishment of an uncle in the city of New York, and remained with him until his majority. In 1843, he went to Pennsylvania and was employed as book-keeper in the iron-works and nail factory of R. C. Nichols & Co., of Norristown. Here he developed his talent for engineering and mechanical pursuits, which subsequently made him so celebrated as an engineer, inventor, and iron-master. He erected the iron-works of Moore & Hooven, of the same place, and while so engaged he conceived and successfully applied a novel method of using the waste heat from the heating and puddling-furnaces for generating the steam necessary to run the engines. He was commissioned in 1847 to construct the works of Reeves, Abbott & Co., at Safe Harbor, Lancaster County, Pa., his duties being mainly of an executive character. After the completion of the work, he continued in their employ as superintendent until 1856, during which time he introduced the governor for controlling the speed of steam-engines used in rolling iron. The well-known invention for making wrought-iron cannon was also invented by him. Many hundreds of these guns, made by the Phœnix Iron Company, and known as the "Griffen Gun," were used during the rebellion. He went to Phœnixville from Safe Harbor in 1856, to take charge of the iron-works there, and remained until 1862. His next invention was for rolling the large wrought-iron beams used in buildings on the small rollers then in use, for which he obtained a patent in 1857, and which is now in successful operation. For years he rolled the largest beams rolled in the world. In 1862, he engaged to erect the Buffalo Union Iron-Works for a firm engaged in the general iron manufacture and in making iron beams. In 1867, he accepted the position of civil and mechanical engineer with the Phœnixville Iron Company, and eighteen months later he was again placed in charge of the works at Phœnixville as general superintendent, which position he held until he died. In 1873-74, he erected the new and large works for the company which are now in full operation. The general plan of the building and machinery was his own arrangement. Mr. Griffen was one of the directors of the Phœnix Iron Company, and was also a member of the firm of Clark, Reeves & Co., the celebrated bridge builders.

EXAMINATION AND SURVEY OF MINERAL LANDS.

Specially Written for the Engineering and Mining Journ

When the owner or intending purchaser of a tract of mineral land decides upon having the property investigated by a professional examiner, it is to be presumed that he (the owner or intending purchaser) will not be indifferent to the value of the results which he may expect, according to whether the investigation is to be conducted by strictly scientific methods, or whether it is to be merely pseudo-scientific; or again, whether it is to be eminently practical, or, on the other hand, to be guided by the deductions of a narrow and one-sided experience, or worse, by the chimeras of charlatanry.

What is the scientific method? When, for instance, it is proposed to determine the expediency of building a railroad through a new country, the very first thing required is a basis upon which an opinion can be confidently founded as to whether it is practicable to build the road, and whether, if built, it can be operated profitably. It is necessary first to *know* certain things respecting the physical configuration and the resources of the country through which the road is to pass. Now, the specific kind of knowledge required in this case can only be obtained by the exercise of scientific method. But when once this knowledge has been obtained, through the reconnoissance and preliminary instrumental survey, and the elements of the most practical route have been determined and exhibited in the form of topographic maps and sectional diagrams, it may be possible for the practical railroad man to form a judgment, by mere inspection of the maps, etc., as to whether it will probably pay to build the road. He bases his conclusions upon a comparison of the cost of operating other roads having similar ruling gradients and maximum curvatures, and upon an estimate of the probable traffic to be developed by the proposed road. He may be able, within the limits of his experience, to make an approximation close enough for practical purposes.

The scientific engineer will determine the same thing by an entirely different method. He formulates the effects of friction, gravity, and the various forms of resistance due to grade curvature, inertia of loaded trains, etc., in terms of available motive power, and so, finally, by the exercise of a strictly scientific induction, is able to arrive at a mathematical expression of the cost of operating and maintaining the road; an expression which is independent of general results obtained elsewhere, and dependent for its accuracy only upon the accuracy of the data employed.

So far, perhaps, there is apparent no practical difference in the results. But the superiority of the method of the one over that of the other reasoner appears when special features of the proposed road, *differing from those of any other existing road*, come to be considered. The inductive method of the scientific engineer now enables him to transcend the limits of practical experience, and to deduce results which the experience of the practical man could not possibly suggest.

As another example of the scientific method, may be taken the case of a mining engineer who, after having made a careful topographical and geological survey of a coal-field, discovers, upon tracing out his instrumental data, a discrepancy in the stratigraphic planes. Further investigation enables him to predict positively the existence of a concealed fault or dislocation of the strata, and perhaps even to define with nice precision its position, extent, and direction.

Now the practical miner could not logically conclude from the limited facts which he is capable of observing that, at a certain distance from the mouth of the mine, in a certain direction, the coal-seam would be found to be cut off abruptly. If he were indeed to venture upon a prediction drawn from his experience, namely, that because he had seen faults in similar positions in all the other mines in which he had worked, it must therefore exist in this one, the conclusion would be drawn from false premises. It would be reasoning from facts, it is true, but from other facts observed elsewhere, and not from the facts of the special case in hand. To the scientific mining engineer, coincidences of this kind would simply set him to inquiring upon what theory such coincidences could be rationally and scientifically explained; and when such a theory is found and accepted, it simply becomes an instrument to be used as a guide to the discovery of additional facts. The practical man knows nothing about the theory, but jumps to the conclusion that the facts exist, whether they do or not. The *pseudo*-scientific examiner, who has made himself very familiar with theories, but not with facts, also jumps to the conclusion that certain facts must exist as a necessary consequence of this or that theory. He is on precisely the same level with the charlatan.

In respect to the application of facts, the practical but non-scientific examiner judges, as already intimated in the first example, by comparison. He reasons from past experience. His motto is, "What has been done once can be done again." And in the ordinary course of events, especially where the conditions are precisely similar, the rule is generally sufficient as well as safe. But it never leads from the known to the unknown. It is the science of the multiplication-table—the things operated upon do not change their quality.

The scientific investigator, on the other hand, brings to light the secret arcana of nature. By the discovery of new facts, he widens the field of research. He follows the *filum labyrinthi* in its devious course, and develops new truths. His method is the science of the higher analysis.

The reasoning of neither can lead to reliable results, however, if the facts upon which such reasoning is based are not reliably established.

The expediency, then, of employing capital to develop the resources of a given body of mineral land depends primarily upon the facts which an intelligent examination of the land itself may disclose. The main difficulty is to discover the real facts. Nature is very reticent with regard to her secrets, and especially with regard to those relating to mineral deposits. Even when the acute researches of highly skilled *savants* succeed in unearthing special facts relating to underground wealth, these same facts seem to still possess a tantalizing faculty for hiding behind the learned phrases of their discoverers. And too frequently it happens that the bewildered non-expert for whose benefit the investigation has been made gives up in despair his efforts to distinguish fact from inference, and is fain to grasp after some practical opinion in the report of the scientific examiner, and hold it for what it is worth as a mere opinion, and to let the rest go for naught; or, failing in this too, perhaps, to seek refuge in the judgment of another more practical and less scientific examiner. The result is, generally, that the decision of the momentous question, "Will it pay?" if it has not been assumed entirely by the scientific expert, must rest, after all, upon a comparison of the opinions of other examiners willing and ready to shoulder the responsibility—opinions which are therefore accepted or rejected, not from any knowledge of the facts and principles upon which they are based, but simply according to the degree of confidence which their manner and language impose.

So it would seem that, unless the scientific expert or mining engineer who undertakes to conduct such examinations also undertakes at the outset to classify and present his facts in such a manner that they may be fully appreciated and clearly distinguished from every trace of inferential data, he may as well make up his mind that, so far as his real scientific work in the case is concerned, it will have but little to do with the final result. He can prepare himself to see his employers fall back upon the system of doing as others have done—a system under which the Chinese have made all their progress during several thousands of years.

The importance of insisting upon a complete instrumental survey and accurate delineation of the physical and structural features—so far as they can be definitely established—of every mineral property before undertaking any important special investigation does not seem to be so fully appreciated as it ought to be.

By such delineation is of course understood the precise representation by means of topographic and diascopographic* maps, accompanied by explanatory descriptions of all economic facts which the present appliances of scientific research enable us to ascertain. To be of real value, they must be rigorously confined to the precise representation of nature. Otherwise, they are but little better than the highly pictorial misrepresentations familiar to us all as intended traps with which to catch the unsophisticated investor.

Accurate and complete topographic and diascopographic maps of a given locality, when properly constructed, have not only the advantage of affording at the outset a permanent basis of reference for all investigations which may be instituted in regard to the property or its products, but they have also the advantage of exhibiting all the known physical features of the property in their relative dependency in a compact and convenient shape for the ready application of measurement and all other means of comparison, and thus of enabling the non-expert to apply for himself all those principles of practical operation which his individual experience may suggest, and thence to form an opinion of his own which is to him, so far as it goes, of equal value with the combined opinions of an infinite number of practical experts, based upon separate examinations upon the ground.

Such maps also enable the scientific engineer to isolate his facts in a clear and intelligible way and to present his inferences in the most forcible and convincing manner. Thus, a statement that the structural features associated with a certain group of supposed quartz fissure-veins indicate the plication of an originally mineralized stratum, and subsequent erosion of the superior mass, leaving denuded only a cross-section of the inferior flexures, would seem too obscure to a hasty reader to excite greater alarm than any other intensely technical statement, such as are common in scientific reports; but when these same structural features are shown in section upon a geological map, one glance shows plainly the immense practical importance of the facts, and the force of the inference drawn from them is at once and fully appreciated.

The conventional means which are necessarily employed in topography to represent tri-dimensional space upon a plane surface are so easily understood that any person of ordinary education can quickly perceive how, by the aid of such maps, he can locate roads between any two points in such a manner that the grade shall at no point exceed a certain given steepness; how he can locate ditches so as to give a required fall to the water, or lay out tunnels or shafts in such situations as to secure the best effects; or lay out drains, and a thousand other details which could not always be done half so well by a special survey on the ground, and so avoid in the beginning many dangerous shoals.

It is in this way that the maps and diagrams of a scientific survey of a tract of mineral land become to the owner what the charts of the Coast Survey are to the mariner. Indeed, they go farther. They enable him, in fact, to convert his pocket-rule into a true divining-rod. W. G. W.

MR. JOHN K. HALLOWELL, of Denver, has issued a pamphlet of 160 pages, in which he gives, in a gossipy and lively style, an account of a summer's trip of observation through the mining camps of Gunnison, which he calls "Colorado's Bonanza County." Mr. Hallowell does not stint praise or blame, and his contribution to the geology and the mineral resources of the county will be read with interest.

A NEW CUPELLING-FURNACE.—Herr Bernhard Rösing, of the Friedrichs Huette, Tarnowitz, Upper Silesia, has brought out a new cupelling-furnace that seems to be the outgrowth of a study of such designs as that of the late Mr. A. Steitz, and the one patented by John Lynch, and in use at the Aurora and Pittsburg works. Mr. Rösing makes his hearth a part of a sphere, a flat bowl of cast or wrought-iron, covered with a protecting lining. For the latter, a material is to be chosen that does not absorb litharge, Mr. Rösing's purpose being to pour off the litharge by tilting. He recommends mixtures of magnesia and Portland cement, or slag or graphite, though he does not appear to have gathered any experience on this point. The hearth is carried on rollers running on curved I-beams, and is tilted by any suitable contrivance. The main point of Mr. Rösing's design is the doing away with the disadvantages attending the gradual cutting down of the litharge gutter and the reduction of the quantity of hearth material which must be put through the blast-furnace. An objection which occurs to us is the difficulty in making a good joint between the hearth-lining and the iron pan or bowl. Drawings of the Rösing cupelling-furnace have been published in the *Berg- und Hüttenmännische Zeitung*, No. 49.

* I believe that the word "topography" has come to be specially applied to the exhibition of the *contour* of a given locality, in addition to its minor features, and I venture to suggest the term "diascopography" to the exhibition of the internal geological structure of a locality upon the earth's surface.

THE MINES OF NEW SOUTH WALES IN 1882.

The usual full report of Mr. Harrie Wood, Under-Secretary of Mines of the colony of New South Wales, has reached us. The government of the colony in June, 1882, purchased six diamond drills, three of which began work during the year, and one reached the object sought for, coal, at a depth of 892 feet, near Gosford, and the good work thus initiated has continued since. It is of interest to note that "it was contemplated to add appliances to the diamond drills which would fit them for use in alluvial soils with as much success as in rocks." Just what the character of these appliances is, the report does not specify. We trust that Mr. Wood will, in his subsequent publications, give a description, and favor the mining world with a full account of the results attained in actual practice. A stock of steel tubing of special make has been ordered from Glasgow for the purpose of having it converted into core-barrels, by which it is expected that fully fifty per cent will be saved, as compared with the previous cost of such connections. The department also purchased five water-augers for searching for a subterranean water supply, a matter of extreme importance in the arid parts of the interior of the colony. These are evidences of a public spirit that can not help telling on the prosperity of New South Wales, and the comprehensiveness of the reports of the "wardens" and "registrars" of the different mining districts, and the manifest fairness and frankness with which they treat of the conditions affecting the interests of each locality, create the impression that, so far as the government is concerned, those interests are in very good hands. The body of the report before us of course refers in detail to matters which are not likely to be of much interest to the American miner. It may be stated, in a general way, that gold mining suffered from that most baleful of adverse influences, long-continued drought.

Mr. Wood says: A careful review of the prospects of our gold-fields shows that the decrease in the export of gold for the year is mainly, if not wholly, due to the drought, and that there are evidences of an improvement in the character of the works on many of the older fields, which may be due to the recognition of the fact that some of our auriferous deposits can not be developed or properly worked without the aid of proper appliances, and the adoption of system in the conduct of the necessary operations, which, if persevered in, will doubtless lead to an increased yield of gold and the working of large tracts of country now lying idle. According to a summary compiled from the registrars' reports, there were approximately engaged in gold mining in the colony 9215 men, of whom 4711 Europeans and 1371 Chinese were alluvial miners, and 3132 Europeans and one Chinaman quartz miners. The product for the alluvial mines was 91,523 ounces, and of the quartz mines 40,451 ounces—a total of 131,974 ounces.

Tin mining does not appear to have suffered much from drought, the high price of tin during 1882 having encouraged the working even of old ground previously abandoned as unremunerative. The export of copper for 1882 fell off somewhat. How far the steady decline since, in the price of the metal, will retard or entirely check the growth of this industry in the colony remains to be seen. Mr. Harrie Wood says that the lodes in some parts of the colonies, though rich near the surface, have not, so far as they have been tested, maintained their size to any great depth, and the ore has not only become poorer but more difficult to treat, so that many lodes which at one time gave great promise have been abandoned. He, however, distinctly makes an exception in the case of the Cobar District. There, the Great Cobar mine, the most important of the colony, has, at a depth of 324 feet, a lode which is from 50 to 70 feet wide at some points. From 11,752 tons smelted, 1805 tons of fine copper were produced. Since this mine was started, in July, 1876, 80,825 tons of ore were raised, equal to 10,987 tons of copper, an average percentage of the metal of 13·59 per cent. This represents a value of over £700,000. The somewhat enthusiastic local registrar makes the statement that there is sufficient ore in sight to keep the mine in full work during the next twenty-five years, and that it can not be worked out in one hundred years. The Nymagee, with a product of 7253 tons of ore, of which 6618 tons smelted produced 1144 tons of fine copper, is the next in importance. Altogether, the mines in the Cobar District are credited with an output of 2959 gross tons, or 6,628,000 pounds of ingot.

Summarizing, we find the product of precious and base metals and of minerals in New South Wales to have been:

	1882.	1881.	Aggregate to date.
Gold, ounces	140,469	154,006	9,365,648
Silver, "	38,618	57,254	765,397
Tin, ingot exported, tons	8,059	7,590	56,114 (since 1872)
Tin ore, "	611	609	14,2 2
Copper ingot, "	4,865	5,361	48,795 (since 1859)
Copper ore, "	93	133	3,?99
Pig-iron, "	4,320	2,737	23,696
Antimony, "	23	2?6	2.141
Antimony ore, "	1.045	302	
Bismuth, "	3	12·5	.....

Including coal, Mr. Harrie Wood estimates the aggregate value of the mineral product of the colony, since its mines were first opened, at £57,859,853, gold heading the list with £34,870,378, followed by coal with £13,204,273.

In spite of the fact that the coals of Australia do not occupy a very high rank, the lack of good fuels in the Pacific has given the mining industry of New South Wales a great importance. Beginning with 1829, the development has been as follows:

	Production.	Exports to intercolonial ports.	Exports to foreign ports.	Home consumption.
1829	780	.....	.....	.....
1840	20,256	.....	.....	.....
1850	71,216	.....	.....	.....
1855	137.076	.....	.....	.....
1860	368,862	140,183	93,694	134,985
1865	585,525	292,664	90,304	202,556
1870	868,564	345,564	242,825	267,681
1875	1,329,729	518,853	408,154	402,722
1880	1,466,180	550,672	202,684	712,824
1881	1,769,597	647,135	372,709	739,753
1882	2,109,282	760,226	501,319	847,737

The report of the "Examiner of Coal-Fields" gives a table showing the exports from Newcastle, N. S. W., in which we find the statement that 100,769 tons were sent to San Francisco in 1882, against 79,337 tons in 1881. The same official gives some interesting accounts of the strata passed through in sinking a number of bore-holes, section of a number of seams, etc. The report also contains reports of progress by some of the geological surveyors. Altogether, the annual report for 1882 is a model in its way, and reflects great credit upon Mr. Harrie Wood and his staff.

THE ANNUAL MEETING OF THE OHIO INSTITUTE OF MINING ENGINEERS

The fourth annual meeting of the Ohio Institute of Mining Engineers was held in Columbus on January 9th and 10th. The Institute met in the office of the Inspector of Mines on Wednesday, President Andrew Roy being in the chair. The secretary read the report of the Youngstown meeting, held May 11th and 12th, 1883, which was adopted, and the treasurer's report was read and approved.

A number of interesting papers were read and discussed, as follows:

First. The Lower Limestone Group Coal Series of Northeastern Ohio, prepared by Col. Charles Whittlesey, of Cleveland. The president stated that, owing to the advanced age of Colonel Whittlesey, he was unable to be present at any of the meetings of the Institute; but although eighty years of age and in failing health, his mind was still clear, and he took a deep interest in the meetings of the Institute. His paper on the lower coals of Northeastern Ohio, the president added, was one of great interest, and he would request Prof. Edward Orton, the State Geologist, to read it. Professor Orton read Colonel Whittlesey's paper, and explained some of the facts discussed in it.

The second paper was entitled Metals and their Properties, by Archibald McKillup, Mining Engineer for the Central Ohio Coal Company. Owing to professional engagements, Mr. McKillup was not present at the meeting, and the paper by request of the president was read by W. N. Day, editor of the *Iron Trade Review*, of Cleveland. This paper was discussed by Professor Orton, Edward Orton, Jr., and Andrew Roy.

The third paper presented was on the Social Possibilities to the Miner, by J. G. Chamberlain, Mining Engineer of the Cherry Valley Iron Company. This paper attracted marked attention, and elicited considerable discussion, J. S. Doe, a mining operator, Professor Orton, Andrew Roy, and others giving their views at length on the best means for the amelioration of miners.

This was followed by a paper on the Bedford Cannel Coal, by Edward Orton, Jr., which was discussed by J. G. Chamberlain, Professor Orton, and others.

Mr. R. S. Whitzel, mining engineer, Logan, exhibited maps of two mines in the Hocking Valley, and explained the manner of mining, the careless and wasteful method of working coal, and the necessity and advantages of periodical surveys of mines.

The following persons were elected members: J. A. Hanlon, George P. Good, Hiram Cowell, P. J. Buehl, E. McMillen, N. D. Chapman, Michael Fox, Oliver H. Hoover. The following officers were elected for the year: President, Andrew Roy; Vice-President, E. D. Shreve; Secretary, Edward Orton, Jr.; Treasurer, N. H. Jennings.

The Institute met on Thursday at nine o'clock A.M., in the office of the Mine Inspector, pursuant to adjournment, Andrew Roy in the chair. Prof. Edward Orton read a paper on the Chemical Composition of Ohio Coals, which was discussed by J. G. Chamberlain, Edward Orton, Jr., Andrew Roy, E. McMillen, and others.

Mr. Andrew Roy followed with a paper on technical mining terms used in Ohio, which was discussed in the alphabetical order in which the glossary had been prepared. After a long discussion as to the best meanings to be applied to technical words for standard use among Ohio mining engineers, Mr. R. S. Paul offered the following resolution:

Resolved, That the paper on the glossary of technical mining terms be printed, and the secretary be instructed to mail a copy thereof to each member of the Institute, with the request that he examine the same and make such suggestions pertinent thereto as he may think proper, and return the same to the secretary before the next meeting of the Institute.

The resolution was adopted.

Mr. Paul then offered the following resolution:

Resolved, That the secretary be instructed to procure a register, in which members and visitors may register their names, residence, and occupation, at each subsequent meeting of the Institute. Adopted.

Mr. Paul offered the further resolution:

Resolved, That the society procure a supply of blanks for application of membership to the Institute. Adopted.

The Committee on Constitution asked an extension of time to report, and was directed to report at the next meeting of the society.

The following papers were then read:

The Development of the Steubenville Coal-Field, by William Smurthwaite, Superintendent of the Steubenville Coal and Mining Company.

An interchange of views was had as to the place of holding the next meeting. Cleveland seemed to find favor; for although outside of the coal-belt, the superior machinery in use for making iron, and especially the docks of Cleveland, were regarded as offering inducements for a visit to the Forest City. Professor Orton's invitation to the Institute to visit the State University before leaving Columbus was accepted. The Institute then adjourned, to meet at the call of the president. The place of meeting will probably be Cleveland, and the date the latter part of June or early in July.

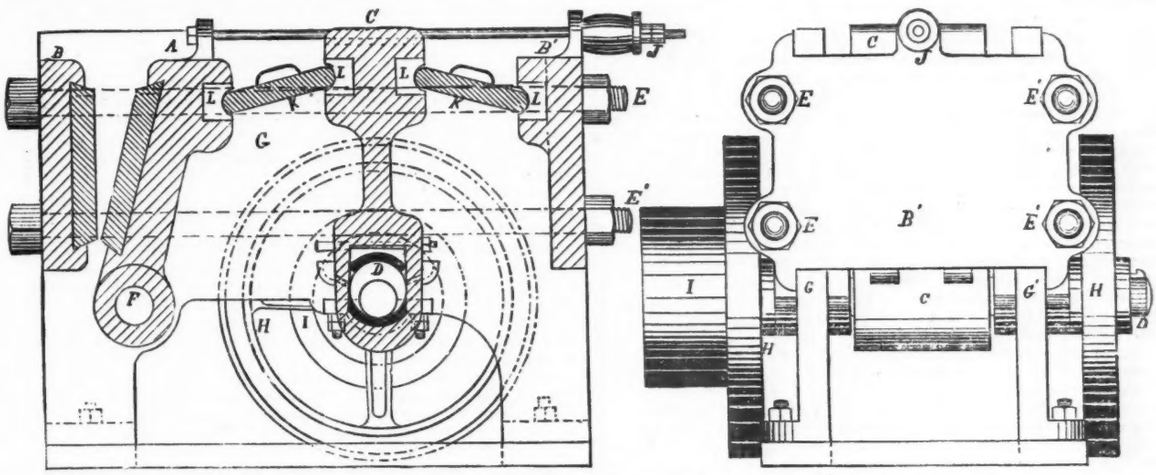
A. R.

THE Ashcroft Manufacturing Company, maker of the Tabor indicator, has issued a very interesting little note-book on this indicator, written by Mr. G. H. Barnes, mechanical engineer, of Boston. Mr. Barnes, after a critical description of the indicator, gives valuable hints as to the uses to which the indicator may be applied, the method of indicating a steam-engine, of computing the horse-power from a diagram, and of constructing the hyperbolic curve. Mr. Barnes, in one of his chapters, gives a table of the feed-water consumption for non-condensing engines, for different degrees of cut-off and different pressures, in the hope, as he says in his preface, of drawing attention to the value of feed-water tests of engines as opposed to simple indicator tests. He gives also the results of an investigation of the comparative performance of the Tabor and the old patterns of the Thompson and the Richards indicator. The little book will be highly appreciated by all steam users, and will, we are convinced, be welcomed by them without any reference to the fact that it deals primarily with the latest form of indicator.

THE BUCHANAN CRUSHER.

With the object of increasing the capacity of pulverizing machinery and relieving it of excessive wear, Mr. C. G. Buchanan, of Messrs. Buchanan & Jennings, of this city, has designed a crusher which has stood successfully the test of continued working. As will be seen by a glance at our illustrations, it belongs to the general type of crushers, its principal features being the following: Of the jaws *A B* the former is movable, while the latter is fixed, *A* oscillating on the steel pin *F*. The crushing faces are flat surfaces, being made of hammered crucible steel, which last from two to four months, being capable of being turned. They are held in place by a small bolt. The stationary jaw *B* is fitted into recesses in the frame *G*, and is adjustable. The crusher can be regulated to crush fine or coarse, by means of the steel tension-rods *E*. Motion is imparted to the jaw *A* by means of the eccentric shaft *D*, pitman *C*, and the toggles *K*, the rubber spring *J* serving simply to keep the movable jaw in contact with the toggles and to assist the jaw in its backward movement.

The crusher can be run by a six-inch belt. Provision is made to take up any lost motion of the eccentric shaft. The seats *L* of the toggles are made removable. Both the seats and the ends of the toggles are chilled. The receiving capacity of the jaws is 3 inches by 20 inches; and as the jaws are not deep, the quantity of material operated on at one time is not great. The crusher might therefore be deemed exceptionally heavy for its work if the object had not been to prevent breakages. When drill-points get into it, the fly-wheel has been observed to stop. The movement at the point of delivery is very small about one eighth of an inch, and three eighths at the top. The principal strain due to the movement of the toggles is taken up by two



THE BUCHANAN CRUSHER.

heavy steel rods *E*. These and the bolts *E'* bind the different parts of the frame together, making it strong and solid. The speed of the crusher is from 200 to 300 revolutions per minute, and its weight about 6000 pounds. When it is necessary to carry the weight of single parts down below a given limit, certain parts of the frame can be made in two parts. The main function of the crusher or "granulator" is to act as an intermediary machine between an ordinary large rock-breaker and pulverizing machines proper. To engineers and mining men who have learned to appreciate the cost of the high wear of all kinds of pulverizing machines, the advantages of delivering into them material broken down to chestnut or corn size will be fully appreciated.

NEW METHOD OF INSULATING WIRES.—In the *Comptes Rendus* of the 15th of October, M. Wiedemann gives an account of a new method of insulating metallic conductors. Having had occasion to employ the methods of Nobili and Becquerel in the decoration of objects of art, he observed that the parts so colored became absolute non-conductors of the galvanic current when the process was completed of covering their surfaces in this way with peroxide of lead or of iron. A wire of copper or brass, or even of iron, can in this way be coated with an insulating surface, and the inventor thinks that in telegraphy and telephony an application of this process may be very useful. The process is simple and the cost small, and the power of the insulating surface to withstand the effects of atmospheric action is a guarantee of its durability. The insulation is, moreover, absolute. The following is the process: Prepare a bath of plumbate of potash by dissolving 10 grams of litharge in a liter of water, to which 200 grams of caustic potash are added, and boil the mixture for about half an hour. Allow the liquor to stand, then decant, and the bath is ready for use. Fix to the positive wire the metal wire destined to receive the peroxide of lead, and place in the bath a small anode of platinum attached to the negative wire. Highly divided particles of lead will precipitate themselves on the negative pole, while peroxide of lead forms on the metallic wire, which passes successively through all the colors of the spectrum. The insulation is not perfect until the wire reaches its last tint, which is a black-brown. The wire so covered is perfectly insensible to electric current. Small clean objects attached to the surface can be brought to the negative pole of a gilding, silvering, or nickeling bath without any deposit taking place upon them. Such a wire placed in the current and brought into contact with another wire in connection with a galvanometer leaves this perfectly unmoved. There is no deviation at all from the current flowing through the wire. M. Wiedemann thinks that such a method will be highly advantageous in the construction of galvanometer coils and other instruments.

A COMPARISON OF THE WORKING OF GERMAN AND ENGLISH BLAST FURNACES PRODUCING FOUNDRY PIG

The thoughtful researches of Mr. I. Lowthian Bell have created considerable interest in Germany, where those furnace-men who keenly feel the competition of the Cleveland District are diligently inquiring into existing differences in the conditions, and are trying to ascertain how far they are responsible for the comparatively unfavorable results in the working of German furnaces Dr. Gustav Klūpfel, of Blankenburg, has recently contributed a valuable paper to *Stahl und Eisen* on the subject, which will give encouragement to quite a number of American furnace-men who are struggling along with lean ores.

In Germany, the consumption of coke per thousand kilograms of iron ranges, with a few exceptions, between 1400 and 1800 kilograms in the case of Bessemer pig and between 1600 and 2000 in the case of foundry pig; while in England, 1000 and 1200 kilograms, respectively, suffice. Referring to Bessemer pig alone, it is found that this grade is generally produced in England from ore carrying forty-eight per cent, the mixture, including limestone, running forty per cent of iron. Such a rich mixture is only used in Germany in those cases where Spanish ores are available. Then, with iron hot-blast stoves, 1250 kilograms of coke are required, and in some instances, with the best of stoves, somewhat lower figures are given. When it is taken into consideration that, in the Rhenish Provinces and in Westphalia, the coke obtainable does not on an average contain more than eighty-six per cent of carbon, five per cent of water, and nine per cent of ash, while the English coke generally runs as high as ninety per cent, it will be understood that there is little difference between the fuel consumption of English and German Bessemer pig furnaces, and little is saved either in Germany or in England by using brick stoves. The matter is quite different in the case of foundry pig, leaving aside a consideration of the Scotch furnaces, because there raw coal is exclusively used. In the Cleveland District, the average percentage of the ores is forty-one, the burden running from thirty-two to thirty-three per cent of iron. Out of from twenty to twenty-five blast-furnaces running in Germany on foundry pig, only two have a richer burden: the larger number are working with from twenty-seven to twenty-nine per cent, and many with as low as from twenty-three to twenty-five. It will be seen that this difference does not appear to be as great as the difference in the consumption of coke, and an ordinary observer may reach the conclusion that the German furnaces making foundry pig have not reached the point of perfection to which their English rivals have come.

Dr. Klūpfel then goes into an elaborate comparison of the consumption of heat in the two classes of furnaces. He takes, as a representative of the Cleveland District, a furnace eighty feet high, eighteen feet in diameter at the bosh, and with a cubical capacity of 11,578 cubic feet; and as a representative of the German practice, a smaller furnace, sixteen meters high, five meters in diameter at the bosh, with a mixture carrying from twenty-three to twenty-six per cent, and a consumption of coke of from 1600 to 1900 kilograms. The basis of his compution is given in the following comparison of the results of the working of the two types:

	Cleveland.	Hartz.
1. Cubical capacity, c. m	330	160
2. Daily production, tons	38·6	34·5
3. Consumption of coke per ton of pig, kilograms	1,125	1,620
4 Moisture in coke, per cent	2·5	5
5. Ash in coke, per cent	7	9
6. Percentage of iron in burden	32·2	23·7
7. Moisture in burden, per cent	2·5	5
8. Quantity of carbonic acid in burden per ton of pig, in kilograms	306	770
9. Percentage of lime and magnesia in cinder	40	50
10. Temperature of blast, degrees C	485	400
11. Temperature of gas, "	332	240
12. Ratio of carbonic acid to carbonic oxide, in gas	0·686	0·480
13. Iron in pig, including manganese, per cent	93·2	94
14. Silicon in pig, per cent	1·5	1·5
15. Phosphorus in pig, per cent	1·5	3·7
16. Carbon in pig, per cent	3·8	3·8

All the figures given from 2 to 16 represent average results over long periods. The figure given in No. 8 can not be calculated from the percentage of lime of the cinder, because, as in the case of the Hartz furnaces, no roasted ores and no calcined limestone are used, and the carbonic oxide of the ore is not combined with protoxide of iron, but with lime or magnesia; but where roasted ores are used, as in the

Cleveland District, a direct determination of the carbonic acid is necessary. The sources of the loss of heat in both cases are given in the following table:

CONSUMPTION OF HEAT PER KILOGRAM OF FOUNDRY PIG NO. III., IN HEAT UNITS.

		Cleveland.	Hartz.
13.	By radiation	+352	+102
12.	gas	+542	+542
11.	evaporating moisture in burden	+107	+199
10.	reduction of carbonic acid to carbonic oxide	+538	+1,026
9.	carbonizing the iron	− 119	− 119
8.	reduction of iron by carbonic oxide	− 20	− 20
7.	reduction of phosphorus and silicon	+210	+154
6.	decomposition of moisture of blast	+100	+135
5.	expulsion of carbonic acid from the limestone	+260	+654
4.	heat of cinder	+811	+1,089
3.	heat of molten pig	+330	+330
	Total consumption of heat by the blast-furnace	3,111	4,092
2.	Furnished by hot blast	589	647
1.	Difference to be furnished by combustion of carbon to carbonic oxide	2,522	3,445
	Equivalent to a consumption of carbon, kilograms	1·020	1·393
	Or a consumption of coke, kilograms	1·125	1·620

This table is based upon the following theory of the blast-furnace, tracing the reactions in the furnaces from the hearth upward. The blast, entering through the tuyeres, leads to the combustion of the coke at that point, carbonic oxide being exclusively produced. By the heat thus developed, the iron and the cinder are melted, and the steam entering with the blast is decomposed by passing about the glowing fragments of coke, carbonic oxide and hydrogen being the result. The ascending current of gas, which is a mixture exclusively at first of nitrogen and carbonic oxide and a little hydrogen, then reduces a part of the phosphoric acid, a part of the silica in the ore, and the last portions of the iron oxide not yet reduced. The carbonic acid thus formed, however, immediately combines with the carbon deposited at a higher point on the ore, and, so long as the temperature permits it, with carbon from the coke, so that a final result of the reaction is again exclusively carbonic oxide. On its way upward, the heat of the current of gas expels the carbonic acid of the charge, which for the greater part is also reduced by the coke to carbonic oxide. The smaller portion of this carbonic acid, as well as the greater part of the carbonic acid produced by the reduction of oxide of iron by carbonic oxide, remains intact and escapes in the gases. That part of the carbonic oxide produced above the tuyeres, which has not been converted into carbonic acid by oxide of iron, as well as that part which has been reduced after this reaction by the glowing coke, rises unchanged until it reaches that part of the furnace where the temperature ranges between 300 and 400 degrees Celsius and where the iron ore has been partly reduced to protoxide. It is in this region—where, also, the reduction of the oxide of iron by means of carbonic oxide goes on—that a small part of the carbonic oxide is reduced to carbonic acid and amorphous carbon, which is deposited in the form of dust within the partly reduced fragments of ore, and which furnishes the material for carbonizing the pig. The carbonic oxide not affected by this reaction escapes, while the carbonic acid thus formed is added to that coming from the sources already mentioned. In the highest parts of the furnaces only the conversion of the moisture in the materials into steam is done.

From this we may see, therefore, that the total amount of carbon in the fuel is consumed either by the oxygen in the blast or by the carbonic acid in the burden, or by the carbonic acid formed by the reduction of the iron, or by the oxygen in the moisture in the blast, or by the oxygen in the silica and phosphoric acid of the charge. Under all circumstances, however, the product of the combustion is carbonic oxide, and not carbonic acid. This theory of the blast-furnaces contains two statements which can not be made without a special defense. It has been said that the blast above the tuyeres produces exclusively carbonic oxide. This, it is true, has been objected to by earlier German metallurgists, and more recently, particularly by Tunner; but after it has been proved that, even in a gas-producer working hot, the percentage of carbonic acid in the gas has been brought down to one half of one per cent, it can hardly be held that in a blast-furnace the carbonic acid finally escaping from the tunnel-head can be the result of the combustion of the carbon. The process of carbonizing the iron has been described in the same manner as that put forward by Bell and by Gruner as the result of special experiments. It seems strange, however, that these eminent metallurgists, in calculating the quantity of blast required, deduct the carbon necessary to carbonize the iron from the total quantity in the fuel, with the object of finding the quantity of oxygen in the gases escaping from the furnaces resulting from the combustion. Now, the quantity of carbon required for carbonizing must have previously been combined with oxygen before it could be deposited in the fragments of ore and melt together with the iron. This discrepancy between Dr. Klûpfel's view and those of Bell and Gruner explains the small difference in the calculation of the above table, the results of which agree with reasonable accuracy with the actual performances in the first table.

Dr. Klûpfel then goes into a very elaborate calculation of the different data given in the table referred to. For these we must refer to the original, and we take up only the conclusions which he reaches, resting upon them as a basis. Considering first the question of the size of the furnace, he insists that only the relation between the capacity and the production should be taken into account. If this relation is not considered, as is frequently the case with English furnace-men, it is only a question of best utilizing the working force in deciding to make a blast-furnace larger or smaller. From this point of view, it may be considered safe to assert that with foundry pig very little can be saved beyond a production of fifty tons per day, and that there is very little difference even between a furnace making thirty and a furnace making fifty tons per day so far as the wages are concerned. The main point aimed at in enlarging a blast-furnace is a reduction of the consumption of fuel, and it is generally hoped that by increasing the capacity a longer action of the gases is obtained and with it a more favorable reduction of the ore. Sometimes, too, it is held that the gases in the case of a larger furnace part with their heat more completely.

It is with reference to these possible two sources of economy in fuel consumption that Dr. Klûpfel examines the two examples chosen. He deplores that it has become the fashion to gauge the size of a furnace by its cubical contents per thousand kilograms of daily production, instead of taking as the basis the time in which the charge passes through it. The latter, in the case of the Hartz furnaces, is about twenty-four hours, while, so far as the English furnaces are concerned, no exact data are available for recent product. Formerly, from sixty-two to eighty hours were given. Taking the cubic contents as a basis, the German furnaces, according to the quality of the pig made, range between 4·04 and 5 cubic meters per metric ton daily capacity, while the English furnaces average from 8.06 to 9 cubic meters. It will be observed that the difference between the two types is, therefore, a very great one, and it might be expected that the process of reduction in the latter ought to be very much more favorable than in the German furnaces. If it were assumed, following Bell, that the entire quantity of carbonic acid in the lime must be reduced, it would be easy to prove at once that, on the contrary, the small German furnace works better than the large English type. It has been noted that, in producing foundry pig No. 3 in an English furnace, the quantity of carbonic acid reduced compares with the quantity in the lime as 100 to 117, while in the German furnaces it is 100 to 87. In making No. 1, the figures would be 142 for the English and 103 for the German, and in the same proportion, therefore, the German type would suffer to a less degree a loss of heat by the process of reduction. The very fact that in the German furnaces the quantity of carbonic acid reduced is not even as large as the entire quantity in the limestone charged, permits the conclusion that Bell's assumption is incorrect, and the percentage of carbonic acid escaping from the top which has its source in the limestone must certainly be greater, because otherwise none would remain for the reduction of the iron in the lower part of the blast-furnace.

TUBBING IN CONTINENTAL COLLIERIES.

Mr. George G. André, in his valuable series of articles in the *Colliery Guardian*, entitled "Continental Colliery Notes," gives the following data:

A point in which continental practice differs from our own is to be observed in the form of the shafts or pits in collieries. With us, the section is always circular, a form that has probably been adopted on account of the materials, bricks and iron, employed as a supporting lining. On the continent, the section is generally rectangular, a form which again has probably been determined by the use of wood for the lining material. Perhaps it would be more accurate to say that the practice of the continent has differed from ours in this respect rather than to describe it as now differing. For in new sinkings, the circular form is in most cases resorted to. This is due to the substitution of brick and iron for the wood almost universally employed in former times. A remarkable circumstance, often entailing much outlay and considerable engineering difficulty, to be noted respecting the old shafts is the replacing of the decaying wood by iron. The tubbing back of water was usually effected by means of wooden curbs or other forms of that material. These were set, packed, and wedged with great skill, and they were thoroughly effective. But the perishable nature of the material has rendered repairs necessary; and now, whenever such repairs are required, it is sought to replace the wooden by iron tubbing. To facilitate the fixing of the iron lining, and to lessen the cost, it is placed inside the old wooden support—that is, the latter is left in as a backing behind the former. The advantages of this method of procedure are obvious and undoubtedly great; but it has its attendant disadvantages. The old wooden tubbing has in all cases yielded more or less and become distorted; often this distortion is very great before the necessity becomes imperative for renewal or repairs. The erection of cast-iron tubbing within these distorted timbers often seriously reduces the free space in the shaft; and as many of the older sinkings were of small dimensions, this reduction of the free space becomes a matter of weighty importance. Besides, the pressure is, under such conditions, likely to be unequally distributed over the surface of the iron segments, and special measures have to be taken to provide for this strain. The iron pieces are curved, that is, they are true segments of a circle; and as the shafts are never square, the segments on two opposite sides have a longer radius and span than those on the other two sides. The strain upon these pieces, which are bolted together at the angles, is not one of compression only, but there is a transverse strain which cast-iron, as all know, is ill able to bear. The consequence is, that security is sought in great thickness of metal. The heaviest tubbing in the world is to be seen in some of these rectangular shafts of the continental coal-fields. The thickness of the segment is calculated according to the radius of curvature and the pressure, on the assumption that they are for a circular shaft. But on account of this assumption, the transverse strain, which is undoubtedly set up, is left out of the reckoning, and the consequence is that, in spite of the great masses of metal used, failures are not uncommon. A notable instance occurred a short time ago at a colliery in Belgium. The thickness of the metal was calculated by the engineer to withstand a head of 42 meters of water; but the directors, for greater security, increased it considerably, so that here the result might, one would think, have been looked forward to with confidence. Yet when the water had risen to a hight of only 35 meters, the tubbing gave way—the segments being fractured throughout a hight of some 20 meters. The new tubbing now about to be substituted for that which failed so surprisingly is very strongly ribbed, and is by much the heaviest yet designed. This failure is a striking proof of the unsuitability of any but the circular form for a cast-iron shaft lining.

The most remarkable example of cast-iron tubbing I have ever seen or heard of has recently come under my notice in Belgium. It is a curiosity in its way—a deviation from common practice that is likely to lead to a heavy outlay, if not to a satisfactory efficiency. What the latter may be, in view of the failure I have already alluded to, is uncertain; but the former is placed beyond doubt by the extraordinary forms adopted. The existing casing of the shaft, which is an old one, is of wood, and consists of wedged curbs well laid in, and originally of

great strength. But the progress of decay has rendered this casing insecure; for some time past, it has been giving way, and it is now greatly deformed. The deformation occasions a reduction of the free space in the shaft, the section of which is small. To avoid cutting away any portion of the wood and also to avoid any further lessening of the sectional area, the segments of the iron tubbing that is to be placed on the inside of the existing curbs have been cast out of truth, to make their surfaces adapt themselves as nearly as possible to the deformed wooden tubbing—that is, they have been designed to sit close to the latter at every point in its irregular surface. Hence, these segments are all dissimilar one to another, and consequently each requires in its casting a special pattern. Moreover, as the joints are not square with the face, they have to be planed and adjusted with the greatest care. An illustration of the unusual requirements of this case happened a short time ago. During transport from the foundry to the mine, one of the segments was broken by some accident while removing it from the railroad truck. The other three segments with which it formed a set had to be sent back to the foundry in order that the new piece might have its joint surfaces accurately planed and adjusted. It is easy to see that, under such conditions, the production of the tubbing must necessarily be slow, tedious, and costly.

THE CONDITION IN WHICH CARBON EXISTS IN STEEL.

An inquiry into the condition in which carbon is present in steel as it is left by the cold-rolling—as well as in its hardened, annealed, and intermediate states—has been made by Sir F. Abel and Mr. Deering for the Committee on Steel of the Institution of Mechanical Engineers. Two series of experiments were made, the earlier ones showing difference in the behavior of the hardened steel as compared with the cold-rolled and annealed steel, and in the amount of carbide of iron left by the oxidizing solution; and the second series was devoted to ascertaining the limits of strength of the chromic solution, within which the same percentage of carbide of iron would be obtained.

First Series.—Disks of steel, weighing about 6·5 grams, were employed, about 2·5 inches diameter and 0·01 inch thick. Twelve were used, all of which were cut from the same strip of metal, the odd-numbered disks—1, 3, 5, etc.—being cut from one side of the axis of the strip, and the others—2, 4, 6, etc.—from the other side. The disks, 1, 4, 7, and 10 were as received for the cold-rolling; Nos. 2, 5, 8, and 11 were annealed; and Nos. 3, 6, 9, and 12 were hardened. The disks to be hardened were placed between two cast-iron blocks, one being recessed to receive the plates, the other being quite flat. These blocks were equally heated to a bright-red; a disk was then placed between them and allowed to remain till thoroughly heated; it was then instantaneously removed, and as quickly as possible caught and pressed between two cast-iron surface plates. The disks to be annealed were bolted between wrought-iron plates, ⅛ inch thick, and so inclosed in a thin sheet-iron box, 5 inches square and 2 inches deep. This was inclosed in a cast-iron box about 15 inches by 6 inches, and the intervening space filled with flue-dust—thoroughly burnt soot—and the whole was then raised in an annealing-furnace to a bright-red heat, sufficient to scale but not peel the iron of the box. The fire was then slackened off, banked up with ashes, and the box left undisturbed in the furnace for twenty-four hours. From certain estimations made, the steel disks in contact with the wrought-iron plates appear to lose carbon during the annealing. Of the annealed disks, Nos. 2 and 11 were those which were in contact with the wrought-iron plates. Disk No. 6 was used for estimation of silicon, which was found to amount to 0·2 per cent. Total carbon was estimated in one disk of each kind, but an inside disk of the annealed series was examined to compare with those which had been annealed in immediate contact with the wrought-iron. Total carbon was, as usual, estimated by decomposing the metal with cupric chloride containing sodium chloride. The filtration was conducted in the combustion-tube itself, so that no loss could ensue from transferring the filtering bed and the carbonaceous matter. The disks were in all cases rubbed with fine emery and cleaned with ether before being used. The total carbon was found to be:

Disk No. 1 (cold-rolled)	gave	1·108	per cent carbon.
" 3 (hardened)	"	1·128	" "
" 5 (annealed, inside disk)	"	0·924	" "
" 11 (annealed, outside disk)	"	0·860	" "

An estimation of the so-called uncombined carbon in three of the disks was made by generally heating them with hydrochloric acid of specific gravity 1·10. The annealed and cold-rolled disks dissolved much more rapidly than the hardened disk, the cold-rolled disk furnishing the largest amount of dark-colored residue. The residue, collected on asbestos in combustion-tubes, washed successively with water, alcohol, ether, and water, were dried, and the carbon estimated by combustion:

Disk No. 7 (cold-rolled)	gave	0·096	per cent carbon.
" 8 (annealed, inside disk)	"	0.052	" "
" 9 (hardened)	"	0·035	" "

Of the remaining four disks, three were submitted to the action of an oxidizing solution—potassium bichromate with sulphuric acid—made by adding to cold concentrated solution of bichromate one twentieth of its volume of concentrated sulphuric acid. The disks were placed on sieves of platinum gauze in the center of 500 cubic cm. of the liquid with the following result: No. 4 disk (cold-rolled) solution of metal began at once with rise of temperature, and a very slight evolution of gas. Black particles in small quantity remained at the end of five days on the sieve; they were attracted by the magnet and appeared spangly under the microscope. No. 2 disk—annealed—solution did not commence till after the lapse of five hours; afterward, solution proceeded slowly; scaly residue left on the sieve; resembled the above. No. 12 disk—hardened—metal at once attacked with considerable evolution of gas. At the end of five days, a little buff-colored matter remained on the sieve, as well as spangles; the light-colored matter was probably silica. The residues which remained on the sieve were placed in the liquid for a further thirteen days. Finally collected and washed, dried, and burnt in oxygen as usual; the iron estimated after the experiment. The following quantities, calculated on 100 parts of the disks, were found:

	Carbon.	Iron.
No. 4 (cold-rolled)	1·039 per cent.	5·87 per cent.
No. 2 (annealed, outside disk)	0·830 "	4·74 "
No. 12 (hardened)	0·178 "	0·70 "

It will be seen that very nearly the whole of the carbon for the cold-rolled disk is left in the form of a carbon-iron compound; and from the annealed disk still more nearly the whole of the carbon. Thus:

	Total carbon.	Carbon in residue from chromic treatment.
No. 1 disk (cold-rolled)	1·108 per cent.	..... per cent.
No. 4 "	..... "	1·039 "
No. 11 (annealed, outside disk)	0·860 "	..... "
No. 2 "	..... "	0·830 "

On the other hand, only about one sixth of the total carbon of the hardened disk was left in the solid residue of the chromic treatment. In the latter case, too, the ratio of carbon to iron in the residue was greater than in the residue for the other two disks, thus:

	Carbon.	Iron.
No. 4 (cold-rolled)	1	5·64
No. 2 (annealed)	1	5·72
No. 12 (hardened)	1	3·93

It is interesting to observe that in the case of the annealed and cold-rolled disks the ratios correspond very closely; they also correspond closely with the proportion of the elements of the iron carbide having the formula Fe_6C_5. The last disk was used to see whether the iron carbide would resist the action of a chromic acid solution containing a large excess of sulphuric acid. There were left 0·84 per cent of carbon and 1·104 per cent of iron per 100 of disk. With this large excess of acid, the carbide broke down.

Second Series.—The strength of the solution of chromic acid and the amount of sulphuric mixed with it was varied, and the different kinds are described as Preparations 1, 2, 3, and 4. From these points, it was desired to ascertain whether its composition is independent, with rather wide limits, of the strength of the chromic solution employed; whether, within these limits, a constant quantity of carbide is obtained per 100 of steel; and how much of the carbon of this carbide, upon treatment with hot hydrochloric acid, would remain unconverted into hydro-carbons. The chromic acid solution used may be conveniently referred to that used for Preparation 2, containing 99 grams of salt per 1000 cub. cent. solution, sulphuric acid being added in the proportion of 0·9 gram of acid to 1 gram of the bichromate. The solution used in obtaining Preparation 1 was a little weaker, being 0·8th strength of the solution of Preparation 2. Preparation 3 was produced with a much weaker chromic solution, its strength being 0·44. For Preparation 4, a hot solution of bichromate was mixed with the requisite quality of sulphuric acid, and the strength aimed at was double that of Preparation 2. The mode of treatment with the chromic solution was in all instances alike, and the experiments were made at ordinary laboratory temperatures.

Preparation 1.—Four pieces of the steel—from 7 to 7·5 grams each—were exposed in separate vessels to the chromic acid solution; 1000 cub. cent. to each piece of steel. At the end of two days, there only remained small quantities of a black-gray powder, which were worked off into the liquid and exposed for several days to the action of the chromic solution, and were then collected together and treated with some fresh chromic acid. In a similar manner, other portions of steel were treated with Preparations 2, 3, and 4, which led to the following results:

	Preparation 1.	Preparation 2.	Preparation 3.	Preparation 4.
Carbide obtained per 100 of steel	13·25	14·16	153·4	4·66 where 4·00 is Fe_3C.
Composition per 100 of carbide				
Carbon	7·31	7·21	6·84	11·77
Iron	90·42	90·64	91·50	80·57
Water	2·37	2·27	1·63	5·57
Atomic ratio	$Fe_{9\cdot85}C_1$	$Fe_{9\cdot694}C_1$	$Fe_{9\cdot867}C_1$	.....
Parts of carbon obtained in form of carbide per 100 of steel	0·969	1·021	1·049	0·266
Parts of carbon unconverted into hydrocarbons by treatment of carbide with HCl:				
Per 100 of carbide	1·410 / 1·238	1·269	0·836	
Per 100 of carbon in carbide	20·87 / 16·93	17·60	12·22	

An examination of the foregoing results suggests the following conclusions:

1. The two chromic solutions used for Preparations 1 and 2 gave similar results both in respect of the percentage of product obtained from the steel and of the percentage composition of the product. The third, a much weaker solution, furnishes results which, allowance being made for the smaller quantities of substance dealt with and inherent analytical difficulties, must be regarded as closely resembling those obtained with the other two solutions.

2. The results obtained with Preparation 4, the strongest chromic solution, indicate that the limit of concentration of the oxidizing solution which the separated carbide is capable of resisting has here been exceeded. Not only has there been in this case a very considerable loss of carbon as hydrocarbons—or possibly as a soluble product of oxidation—but the iron in the separated carbide has also been to a considerable extent attacked, and only a relatively small proportion of the carbide remains, together with separated carbon, the latter partly in a hydrated form, and possibly also in some partially oxidized insoluble form.

3. The small amounts of water obtained by the combustion of Preparations 1, 2, and 3 may indicate that, in these also, small quantities of carbohydrate are present with the iron carbide. This may result from the action of the chromic solutions on the carbide first separated, and may account for the not very definite, though on the whole uniform, atomic ratio of iron to carbon in the products of Preparations 1, 2, and 3.

4. If the carbon unconverted into hydrocarbons by treatment of the products with hydrochloric acid be deducted from the percentage of

total carbon in the products of Preparations 1, 2, and 3, the results exhibit a uniformity which, if accidental, is somewhat remarkable. Thus:

	Preparation 1.	Preparation 2.	Preparation 3.
Percentage of total carbon	7·31	7·21	6·84
Less carbon unconverted into hydrocarbons	1·38	1·27	0·84
There remains of carbon, per cent	5·93	5·94	6·00

The atomic ratio of this residual percentage of carbon to iron is as 1 to 3·270 of iron.

5. The carbon separated in the solid form as carbide and carbohydrate more nearly approaches the total amount (1·144 per cent) of carbon contained in the steel in the case of No. 3, when the weakest chromic solution was employed—a result which was anticipated.

These results serve to confirm the view that the carbon of cold-rolled steel exists, not simply diffused mechanically through the mass of the steel, but in the form of an iron carbide, a definite product capable of resisting the oxidizing effect of an agent which exerts a rapid solvent action upon the iron through which the carbide is distributed. It is to be hoped that opportunity may be found to continue these experiments with unfused cementation steel, and with other ingot steels in the same and in different conditions of temper, using the weakest chromic solution which gave the most favorable results.

FURNACE, MILL, AND FACTORY.

The new furnace for making dephosphorized metal erecting by the Brier Hill Iron and Coal Company, Ohio, will soon be completed and ready to begin operations.

The Penn Iron-Works, at Lancaster, Pa., resumed operations after an idleness—owing to a reduction of wages—of several weeks. At present, the reduction will be governed by prices in neighboring mills of the same order. Nearly all of the former employés have left, and non-union men will fill the mill, but no difficulty or trouble is apprehended.

The Catasauqua Manufacturing Company, Catasauqua, Pa., has started up in all works. The works have been idle four months. Stuart & Co.'s wire mills, South Easton, Pa., idle several weeks, are in full operation again.

It is stated that a machine has been invented for the manufacture of hob-nails, and a factory will soon be established in Pittsburg, Pa. Each machine is operated by three men, and, it is claimed, is capable of doing the work of 100 men.

The Deane Steam-Pump Company has fitted up the necessary pumping apparatus for the water-works of nine cities within the past few months, costing from $4000 to $16,000 each. The company is at work on five more of these pumps and engines, and three large pumps, one of which is of 28-inch diameter, are ready for export. The company is running its works on full time, and it employs about 225 men in the different departments. The past year has been a prosperous one, the business having been in excess of any former season.

The Chapman Valve Company, of Boston, has moved its sales-rooms and offices to more commodious quarters on the ground floor of the Mason Building, No. 72 Kilby street.

RAILROAD NEWS.

The annual report of the Lehigh Valley Railroad Company, presented at the annual meeting of the stockholders held in Philadelphia, showed the total coal tonnage for the fiscal year ended November 30th was 6,592,646 tons, of which 6,527,912 tons were anthracite and 64,734 tons bituminous. The income from all sources for the year was $11,310,171.99; the operating expenses, $6,175,656.16; and net earnings, $5,134,575.83, from which a balance of $122,598.61 is left to the credit of profit and loss, after paying all interest, dividends, and other obligations. Additional steam vessels in the lake service were recommended, and the work of improving the grounds of the company at Perth Amboy was reported to be progressing rapidly. The report says, in reference to the issue of stock at par among the stockholders in 1875, that since that time both the mileage and equipment of the company have largely increased and large investments have been made at different points on the line. "To represent the capital so invested, and to meet other intended improvements and extensions, the board has directed the creation of an amount of common stock equal to 20 per cent of the whole stock now outstanding, to be issued *pro rata* to the stockholders at par, payable in five installments at intervals of three months, interest at the rate of 5 per cent to be allowed on payments, and the stock to be entitled to dividends declared after January, 1885." The gross earnings show an increase of $1,150,102.18; the operating expenses, an increase of $341,978.83; the net earnings, an increase of $808,183.36, and the credit balance, after all dividend payments, an increase of $17,052.70.

The annual report of the Board of Directors presented at the meeting of the Philadelphia & Reading Railroad showed a surplus for 1883 over all liabilities of $2,157,233.06, allowing of a 7 per cent dividend on the preferred stock, 6 per cent on the common stock, and a balance of $67,000 applicable to the interest on the deferred bonds.

The total net profit of both the Railroad and Coal and Iron companies was $15,385,842.67, from which is deducted all rentals, $6,412,426.67, and all interest account, amounting to $6,816,182.93; leaving a net balance of $2,157,233.06 as stated above. The profit from the Jersey Central Railroad for the last six months was $633,482.57. The road carried in 1883, 18,195,264 passengers, 11,449,373 tons of coal, 7,159,682 tons of merchandise, and 1,257,106 tons of the company's merchandise material; total tonnage, including passengers, 22,933,311 tons.

The report dwells at length upon the lease of the Central Railroad of New Jersey, which is regarded as an acquisition which will work immensely to the future success of the road and the benefit of the stockholders. The directors recommend the creation of a collateral trust loan of $12,000,000 at 5 per cent, to pay off the floating debt and the outstanding income mortgage bonds, and also to purchase outright 50,000 shares of Jersey Central stock, for the purpose of obtaining absolute control of that corporation.

The report announced the irrevocable determination of Franklin B. Gowen to retire from the presidency of the company, and recommended as proper the election of George De B. Keim, the present Vice-President, as Mr. Gowen's successor. The following gentlemen were elected: President, George De B. Keim. Managers, J. B. Lippincott, Henry Lewis, I. V. Williamson, Edward C. Knight, Joseph B. Altemus, Loring A. Robertson. Treasurer, William A. Church. Secretary, Albert Foster. The meeting then adjourned until Monday, January 28th, to reconvene at the office of the company on Fourth street, to vote upon the declaration of a dividend.

The annual report of the West Virginia Central Railroad Company shows the gross earnings of the road for the year to have been $91,533.85; working expenses, $35,279.26; net earnings, $56,254.59; coal receipts at Piedmont, $268,373.65; coal disbursements, $227,335.52; total net earnings, $97,292.72. The track is now laid to Fairfax Summit, 47 miles from Piedmont, on the Baltimore & Ohio Railroad. An extension of 5½ miles from the Summit to Davis, at the Junction of Beaver and Blackwater rivers, has been located and work begun, and will be pushed to completion as rapidly as the weather will permit. This company is developing the Elk Garden semi-bituminous coal region.

The Joint Executive Committee (freight department) of the pool railroads has approved Mr. Fink's action in ordering the Delaware, Lackawanna & Western Railroad to be cut off from through facilities west of Buffalo. The order went into effect January 14th.

Under the new pool, coke shipments between Connellsville and Pittsburg are divided, according to the Connellsville *Courier*, between the three rival roads as follows: Pennsylvania, 47 per cent; Baltimore & Ohio, 33 per cent; Pittsburg, McKeesport & Youghiogheny, 20 per cent. The latter road only reaches about 770 out of nearly 10,000 ovens, and its percentage of the pool is the product of 2000 ovens. In order to get its share, the other roads are compelled to deliver a certain number of cars to it, and the Pennsylvania road has determined upon Summit station as its point of delivery. The Baltimore & Ohio delivery point will be at Broad Ford, where the proper siding room and connections are now preparing.

LABOR AND WAGES.

Arrangements are making to resume operations in all departments of the Manhattan Hardware Works, at Reading, Pa. A notice on the door states that the 10 per cent reduction is only for the month of January, and that after February 1st, the former wages will be paid.

In consequence of the reduction of 15 per cent in wages, the nailers and puddlers at the Robinson Iron Company's Works, at Plymouth, Mass., quit work on the 12th.

The differences between the proprietors and the finishers of the Soho Rolling-Mill, at Pittsburg, Pa., have been adjusted and work has been resumed.

President McBride, of the Miners' State Association, has issued a call for a State Convention of the miners of Ohio to convene at Columbus, Tuesday, January 22d. Each mine is to send one delegate. The questions to be considered are: First, the report of the screen commission so far as it relates to truck, screens, and the payment of wages; secondly, organization and miscellaneous business.

At some of the Reading collieries, a reduction of ten per cent has been made on gangway work and a slight reduction on some breast work.

At the Scott Iron-Works, at Reading, Pa., 125 men, consisting of machinists, boiler-makers, and laborers, were informed of a reduction in their wages, ranging from fifteen to thirty cents per day. Some of them stopped work, but the works are still running with the reduced force.

The Penn Iron-Works, at Lancaster, Pa., which suspended operations a week before Christmas, have resumed work at reduced wages, the reduction to be governed by prices paid puddlers in the mills of neighboring places.

Secretary Flannery, of the Miners' Amalgamated Association, has made a proposition to the operators of the fourth pool to close three pits which are working for a quarter of a cent less than Umpire Weeks's award, by furnishing one half the money necessary from the funds of the Association, provided the operators will furnish the other half. His object is to close these pits and keep them closed until a uniform rate is secured. Several members of the association say that the proposition is in the nature of a conspiracy, as it incites men to strike, and that if President Costello had been consulted, the proposition would never have been made. Secretary Flannery denies that there is any ground for the charge of conspiracy, as it requires two persons to get up a conspiracy, and he was the only one who knew of the affair. His object was to secure peace between employer and miner.

COAL TRADE NOTES.

FRANCE.

A cablegram reports an explosion of fire-damp at the Ferfay coal mine, Arras. Seven men were killed and twelve rescued. It is feared that five others, who are not accounted for, have perished.

KENTUCKY.

ASHLAND COAL AND IRON COMPANY.—The receipts of coal for the month of December were 315,751 bushels, and the sales during the same time were 274,876, and the shipments to Lexington were 43,250 bushels.

MARYLAND.

Mining around Frostburg continues very dull. Not any of the mines between Frostburg and Lonaconing are working over half and quarter time. Hoffman mine, of the Consolidation Company, ran four short days last week, giving about nine cars for two men. The slope of the above mine will be extended several feet farther down in the near future. This mine gives steadier employment to the miners than any other mine of the same company. The other mines of the company are running very slack, scarcely giving the men sufficient work to buy bread. The Borden shaft resumed operations the first day of the new year, after being idle one week, but as yet is doing but little work. Blaen Avon mine is loading ten Pennsylvania Railroad cars a day, giving the men nearly half-time. The Midlothian mine is working about the same as when last reported. The Miller mine, upon an average, works about two days a week.

In the George's Creek region, mining affairs are very dull, and will no doubt remain so until the new contracts for the present year are made. The Lonaconing *Review* states that the Elk Garden mines are working full-time. The Hampshire mine continues to work full-time, but the large number of men in the mine is too great for the distribution of cars. Phœnix and Franklin mines are working very little. The Potomac mines continue running full-time, employing a large force. Swanton mine is working, as it has for several months—ten cars per day. Ocean and Midland mines are doing very little work. The George's Creek Company's mines have been working about full-time. The mines of the Maryland Company are also idle, with the exception of a repair force. Jackson mines have been doing but little the past two weeks. Superintendent Clark has been engaged in taking an inventory of the company's property. Koontz mine, of the New Central Company, was idle last week, repairs being necessary in the mine. It is stated that this company is preparing to resume operations at the Big Vein mine, which has been idle over a year.

BLAEN AVON.—The stockholders met at Cumberland, and elected officers and directors for the ensuing year as follows: President, Andrew Spier; Vice-President, Dr. G. E. Porter; Secretary, J. V. Hart; Directors, Andrew Spier, Dr. G. E. Porter, F. Mortens, J. K. Shaw, John Sheridan, and W. L. Shaw. All are re-elected.

OHIO.

It is stated in the governor's message, that the inspector of mines estimates a falling off of the output of the mines of one and a quarter million tons, as compared with last year. This is attributed to the present depressed condition of the iron industry, into which the consumption of coal so largely enters.

His report shows that 26 fatal accidents occurred in the mines during the year, and he estimates the coal production for the year ended November 15th at 8,225,000 tons, which makes one life lost for each 316,346 tons of coal mined.

No other State in the Union, in which mine inspection laws are in force, makes as favorable a showing.

There is a growing disposition on the part of miners and their employers to settle all differences arising out of wages and other disputes without resorting to the unwise methods of strikes.

The inspector of oil states that the law regulating the manufacture and sale of oils is rigidly enforced throughout the State; manufacturers, dealers, and consumers continue to yield a cheerful compliance with the provisions of the statutes, and the working of the law is giving satisfaction to all concerned. While a few slight accidents have been reported, which, on investigation, were proved to have been caused by carelessness, it affords pleasure to report, so far as the inspector has been able to learn, from the use of Ohio legal oils as an illuminator, no lives have been lost and no property destroyed. The number of barrels inspected and consumed during 1883, in the State amounts to 286,911.

The coal mines at East Palestine are both running steadily at present. State Line bank is shipping from five to six hundred tons a day.

Mr. John H. Denham has started to open up Maple Hill mine at Barton, four miles south of Maynard. An entry has already been driven 90 yards into the coal, which averages five feet. The tipple frame and other work are pushed forward. Shipments will begin as soon as the spring trade commences.

From Chapman, the burning down of Willow No. 5 is reported—cause unknown. Sippo mine has been troubled with water to the extent of delaying the hoisting of coal for some days. The Mountain mine has once more resumed operations on a sixty-ton per day contract, which will give the men about two-thirds time.

The large mines of the Pittsburg & Wheeling Creek Coal Company, two miles from Bridgeport, on the Cleveland, Lorain & Wheeling Railroad, are not running as briskly as has been their custom. The company has two very large mines there, giving employment to over three hundred men; these mines were kept running full-time all last summer and fall; the works not now averaging over half-time During the fall, a new opening was made into the back part of the coal-field, and a tram-road a half-mile long built up the hollow to it, on which a large locomotive is run. A fine new tipple was built between No. 1 and No. 2 tipple, from which coal can be dumped rapidly. The coal-seam in these works varies from five to six feet. The miners are paid cash 75 cents per ton for coal run over an inch and a quarter screen. In April last, the company began opening up an extensive coal-field at Maynard, where it owns one square mile of fine coal property, twelve miles north of Bridgeport, on the above railroad. Two openings were made, from which between five and six hundred tons of coal are daily brought out. These openings are several hundred yards apart, and each is a separate and distinct work, but the coal from both is run on to a fine large double tipple, capable of dumping 1000 tons daily. New entries are driving and preparations making for increasing the shipments this spring. These mines are both in fine condition and bothered but little with water. The coal averages about four feet ten in hight. At present, 150 men are employed, receiving 75 cents per ton over an inch and a quarter screen. This company has also built up quite a little village, known as New Pittsburg. It has now up and occupied 68 houses, to which will be added a number this spring. Work has been very good at these mines, but is a little slack at present.

PENNSYLVANIA.

ANTHRACITE.

The Lykens *Register* gives a very interesting review of the working of the mines in that neighborhood during the past year and of their prospects. It states that the year just closed was the most successful in the amount of coal shipped ever experienced in the history of the mines. Besides 506,695·19 transported by rail, the local sales of about 11,500 tons swell the quantity of coal mined from the two collieries to the enormous figure of 517,000 tons. Of this, the product of Lykens Valley colliery was over 178,000. When it is considered that this mine was not in full operation until the third week in April, when Short Mountain slope, burnt out by the fire of November 19th, 1882, was started up, this showing is certainly a gratifying one. Work has been steady and attended with remarkably few accidents, considering the extent of the workings, which exceed those of any other colliery in the State, and the great amount of machinery employed. Only two fatal accidents occurred in the Lykens Valley colliery, and in neither of these was there any blame attached to the operators. The prospects are bright for this year, many new arrangements and improvements having been made and others contemplated. Four hundred and forty-three mine cars are in use; there are 188 mules employed and twenty-four miles of rail. The number of men and boys employed is between 1000 and 1100.

Speaking of the Summit Branch Company at Williamstown, the review says it has been an active year, and the employés have no reason to complain of time lost by suspension or partial suspension of work. Last year, when the total tonnage mined footed up in round numbers 318,000 tons, it was regarded with amazement; but the production of 1883, which reached 334,826·07 tons shipped by rail, shows a decided increase over all former outputs. To this, however, there must still be added 4838 tons, the local consumption, which will make a total of 339,654·07 tons.

A. J. Womelsdorf has been made superintendent of the mining department of the Girard estate, and after January 14th the engineering corps of Major Heber S. Thompson will be consolidated with that of Mr. Womelsdorf.

Another tunnel will shortly be started at the Herbine colliery.

A vein of Eckert's mine, several miles below Reading, and extending under the Schuylkill River, caved in January 10th by force of the current in the river. It is stated that the entire mine is submerged, and much valuable machinery damaged. The mine is 250 feet deep, and it is thought it will be impossible to repair the breaks and pump it out. It has been worked for thirty years. No person was injured.

DELAWARE, LACKAWANNA & WESTERN.—Successful mining operations in sinking a shaft on Susquehanna River flats, opposite Wilkes-Barre, were attained January 10th by this company. The shaft sinking is known as the Pettebone, is 10 by 35 feet, and is now down to rock-bed, through 78 feet of quicksand and clay. Many hundred thousand dollars have been expended in endeavoring to sink shafts on these flats; but this is the first one to reach the rock and give signs of ultimate success. It is regarded as a wonderful feat in mining engineering, and is a noteworthy item in the history of anthracite development. Work has been going on for a year past, and has been remarkably free from accident. General Chief Mining-Engineer Snyder, of the Delaware, Lackawanna & Western Company, had charge of the work; and when the rock was reached, he gave orders to fly the "Stars and Stripes" over the opening. This development has been anxiously watched throughout this entire region, and its success was not believed until pieces of rock were brought up from the bottom. This will change many anticipated programmes in mine operating in this vicinity, and open up a vast coal-bed which it was intended to develop by tunneling under the river. The event is to be celebrated by a banquet, at which the officials of the company will be present.

LEHIGH COAL AND NAVIGATION COMPANY.—This company, it is said, has established a beneficial fund on the most liberal and substantial basis, for the benefit of its employés. The company will pay into it one cent for every ton of coal produced at its mines. The inside workingmen employed on its property will pay into it one per cent of their earnings, and the outside workingmen will pay into it one half of one per cent of their earnings. All contributing workmen who may be accidentally injured when actually engaged in the service of the company shall be entitled to the following benefits: In case of accident, which shall cause disability lasting more than one week, the person injured shall receive a sum equal to one half the weekly wages of the class of workmen to which he belonged for each week of such disability. In case of accident which shall result in death, thirty dollars will be paid for funeral expenses, and a sum equal to one half the weekly wages, as in case of injury, will be paid to the legal heirs of the deceased, for one year from the date of the accident. All moneys paid into the fund are to be placed in charge of a board of trustees, to be appointed from time to time, by the President of the Lehigh Coal and Navigation Company. The first board of trustees so appointed consists of Mr. George Ruddle, of Mauch Chunk; Hon. Michael Cassidy, of Nesquehoning; and Mr. Daniel Shepp, of Tamaqua. Workingmen not desiring to contribute to the fund nor to share in its benefits can, after any monthly pay-day, receive from the Lansford office the sum deducted for the fund from their last month's pay, but their name will not be again enrolled among the contributors. It is believed the fund thus established will be ample to meet all claims from accident or death, as the company is now running about a million tons of coal a year, which will give $10,000 a year as the basis of the fund. The scheme will go into operation on January 18th, 1884.

PARRISH.—A charter was granted at Harrisburg, January 12th, to this company of Plymouth, Luzerne County; capital, $300,000.

BITUMINOUS.

There are no prospects of a strike in the Fourth District among the miners at the present time. A correspondent of the Pittsburg *Telegraph* gives a detailed account of the mines in this district, which shows that the reports circulated are without foundation. The first mine on the Low-Grade Railroad is situated a Tyler's station, and is only working half-time, employing 45 men. The next mine is the Rochester at Du Bois, employing 450 men, and operated by Bell, Lewis & Yates. The Hildrup mine of the Sandy Lick Gas-Coal and Coke Company is working half-time. The Falls Creek mine of McConnell & Co., with 57 men, is working full-time. At Reynoldsville, the Hamilton mine works with 100 men. The Soldier Run works of Powers, Brown & Co., with 125 men, and the Sprague mines of the same company, with 138 men, all have been working about half-time. But it is contemplated that these works, since the reduction, will work full-time; that is, if there is no resistance made by organized labor, and that is now deemed improbable. The Oak Ridge mine, at New Bethlehem, is practically idle, but will, it is alleged, before long resume work. The Fairmount works of the Northwestern Coal Company, with 104 men, are running half-time. The Long Run works, of the same company, with 127 men, are doing about the same work. Mitchell & Stevenson's Pine Run works, at East Brady, with 124 men, are running steadily. The Bostonia works, of the Northwestern Company, are idle, and will not resume work before spring. The Hardscrabble mines, owned by Hon. Galusha Grow, with 159 men, are working only at intervals. The Catfish mine in Clarion County, with 43 men, is working full. This company uses mining machines. The Hillville works supplies coal for the railroad company only. At the Monterey mines, Clarion County, the 46 men employed are getting all they can do. The Riverview mines, with 60 men, are running full. Forty men are making full-time at the Gosferts Coal Company works at Cowanshannock.

The shaft of John Whitehead, near Houtzdale, the only shaft in the Clearfield region, was burned lately, entailing a loss to the company of $15,000. There were but four men and a mule at work in the mine at the time. The men made their escape, but the mule had to be abandoned to its fate. The shaft soon filled up with water.

BARCLAY.—This coal company reports its income from rent of railroad and royalty on coal for December at $9260, and $100,227 for the year 1883, being $10,462 in excess of the previous year.

COKE.

Mr. William Baldwin, a retired railroad contractor and director in the Pittsburg & Connellsville road, died at Connellsville a few days ago, at the age of seventy-two years.

The coke trade still drags its slow length along; it is no better, and it could not be much worse. It is true, says the Connellsville *Courier*, there are but few idle ovens, and at first blush trade seems rosy enough. Of the 9695 ovens now in the Connellsville region proper, but 778 are idle, the lowest percentage of smokeless ovens it has been our duty to record for many months. Of these, but 459 are idle on account of a dull market, the 319 others being tied up in litigation. Of the 8917 active ovens, many are running only three days in the week, notably those of McClure & Company, and Morewood; others are barely keeping their ovens warm by pulling them once a week; still others are working five days. Upon the whole, however, a general average of the region shows the output to be equivalent to a run of four days in the week, so that the 8917 active ovens may be said to be running two-thirds full. Some of the more fortunate operators have orders enough to keep them going every day; but so far, the agreement to shut down one day in the week, and thereby curtail production, has been strictly adhered to. Prices remain unchanged, there being no upward tendency at least. Quotations are given out at $1.10, but the ruling rate is $1, with some sales below this point. Labor is plenty, consequent upon the curtailed production, and there is no need of importing Hungarians now.

GENERAL MINING NEWS.

ARIZONA.

GRAHAM COUNTY.

The following figures, said to be official, give the production of the Clifton District copper mines:

	Pounds.
Detroit Copper Company	3,500,000
Arizona Copper Company	2,800,000
Total	6,300 000

The Detroit Company ran but one furnace. The Arizona Company's output is not as favorable, on account of its lack of smelting facilities. It began the year with two old-fashioned adobe furnaces. In March, one of these was removed to make room for an improved Rankin & Brayton 32-ton water-jacket smelting-furnace, and another of like capacity and same make was added to the reduction plant in May. Up to September 1st, when the stacks were blown out for good and taken down, in order to begin excavations necessary for the foundations of the new plant, the rule was to keep only one furnace blown in at a time, the exception being when two were running simultaneously. This was partly on account of siliceous ores from the Queen and Metcalf mines and want of proper flux. Since that time, the company has discovered among its own claims iron ore and limestone in great quantities; and when the new plant starts up, no trouble will be experienced for want of proper flux. The Detroit Company also contemplates improvements on a large scale, which will enable it to largely increase its output.

PINAL COUNTY.

CHRISTMAS GIFT.—According to the Florence *Enterprise*, this mine has been purchased by Ohio capitalists for $90,000. The same gentlemen bought the Copperosity group some time ago, for $100,000. This fact was at the time mentioned in the JOURNAL. It is the intention to erect immediately two 40-ton

smelters at the copper mines, and a 40-ton silver-galena smelter at the Christmas Gift mine. The latter mine carries, in addition to the gold ore, large quantities of galena, anglesite, and lead carbonates, averaging 45 per cent lead. Work is pushed vigorously.

SILVER KING.—At the annual meeting, held at San Francisco, January 8th, the following gentlemen were elected: B. A. Barney, President; J. L. Jones, Vice-President; James M. Barney, Treasurer and General Manager; Joseph Nash, Secretary; and Arthur Macy, Superintendent.

The reports presented show that the year 1883 gives but little to report in addition to those preceding it. There has been no change in the mine, mill, or management, excepting in the various details of the work from day to day. The main vertical shaft has been sunk something over another hundred feet, and a station put in 100 feet below the 714 level. This level has given most of the ore extracted and reduced the past year, and continues to do so.

At the mill, an artesian well was put down as an experiment, and proved so successful that another is now drilling of larger diameter, which will be followed by others, hoping thereby to procure a sufficient supply of water other than that procurable on the surface. The mine has been running on short water about six months, but it is believed these wells, when completed, will end that trouble.

The principal proposed additions to the plant the present year are the introduction of the electric light at the mine, above and below and at the mill, air-compressors with power-drills, including one diamond drill, at the mine, and the sinking of artesian wells at the mill. The suspension of dividends for five months of this year is attributable to short water at mill, bad air and lights during the heated term in the mine, and unusual but necessary expenditures of money in securing claims adjoining our own, the settling of various lawsuits, and securing title to property. Notwithstanding these various items, however, there were produced $600,000, and $175,000 divided among the stockholders, in seven dividends of $25,000 each, during the year 1883.

The amount of ore crushed at the mill during the year was 22,682 tons, yielding 67 shipments of concentrations of a little over 11 tons each and aggregating 758 387-2000 tons. Thus the ore shipped weighed about 3·34 per cent of that crushed. The average assay value of the ore as per daily assay was $42.90, and that of the tailings, which can be determined pretty accurately on account of the presence of little or no native metal, was $4.89. Two thousand three hundred and ninety tons of ore are now in reserve in the mill-yards.

The receipts and disbursements from January 1st to December 31st, 1883, were as follows:

RECEIPTS.

Balance on hand	$39 385.57
Sales of concentrations	592,503.53
Total	$631,889.30

DISBURSEMENTS.

Sampling and assaying	$739.10
Expense	22,349.10
Insurance	750.00
Law	1,012.00
Purchase of adjacent mines	14,000.00
Freight	19,620.81
Merchandise and lumber	40,670.18
Superintendent's drafts	332,591.46
Dividends	175,000.00
Balance on hand	25,156.65
Total	$631,889.30

YAVAPAI COUNTY.

The meeting held recently in regard to the erection of reduction-works at Prescott, resulted in nothing definite, nor in the suggestion of any approved cause of action.

CANADA.

PROVINCE OF NOVA SCOTIA.

OXFORD.—Under date of the 15th of December, M. F. Hunt, president of this company, whose mines are located in the Lake Catcha District, has issued a report on the operations of the company since its organization. The property of the company was increased from the original 35 mining areas by twenty areas, in December, 1882, north of the original purchase, and in the summer of this year by further acquisitions, by which the capital stock was increased to $125,000. An additional eight areas were purchased for 25,000 shares of the capital stock, of which 5000 shares were afterward donated to the treasury. Since the purchase was concluded, $13,300 in all have been taken from this new property in 2½ months. The ten-stamp mill appears to be doing excellent work, the tailings running 88 cents per ton from $60 rock. From August, 1882, to December, 1883, 2177 tons were milled, yielding 3318·73 ounces of gold, the total receipts from bullion to the end of the year 1883 being $69,322, of which $30,000 have been paid in dividends.

COLORADO.

CLEAR CREEK COUNTY.

John Dumont, of Idaho Springs, has bonded and leased the California, Benton, Pittsburg, and Silver Mountain West lodes, and the Bay State tunnel at Empire, and begun work with a large force of men. It is stated that Mr. Dumont contemplates erecting a smelting plant at an early day, something on the plan of the one he put up at Freeland, and will buy ores.

DUNDERBERG.—This property is steadily worked by a force of about 35 lessees, and produces an average of $5000 a month. It is sadly in need of development, without which its production will steadily grow less. So long as the mining is done at the New York office, says the Georgetown *Courier*, the property will degenerate. For the fiscal year ended May 31st, 1880, the gross production was over $92,000; May 31st, 1881, $113,000; May 31st, 1882, $138,000; May 31st, 1883, $106,000. The production the present fiscal year, judging from the production of the past seven months, will not amount to $75,000.

FREELAND.—The bullion smelter, at Freeland, has been purchased from J. M. Dumont, by this company, which takes possession the first of next month. The smelter has a capacity of 24 tons in twenty-four hours. During 1883, it smelted 6500 tons of ore, mainly from the Freeland. The production for the year amounts to $208,452. No ore has been milled since October 1st, as it is the intention to wait until possession is obtained of the smelter recently purchased. The entire product as given above was treated at the Dumont smelter. The air-compressor for the Freeland mine has arrived at Idaho Springs. The total weight of the machinery is 40,000 pounds, or two car-loads. The machinery will be moved at once to the mine, and will be put in operation as soon as possible. With this the management will be able to sink at least 1000 feet deeper.

UNITED TUNNEL.—This tunnel is run for the purpose of opening up the Cross-Cut, Wootton, Ore Bell, Silver Glance, Mamie, and Snowdrift lodes, and is now in about 250 feet. The Cross-Cut and Wootton lodes have been intersected, both showing a large body of quartz scattered with mineral. The tunnel is on the west side of Kelso Mountain, facing Irwin's Peak. The Ore Bell will be cut by the tunnel about 60 feet farther in, or at a depth of 210 feet, and the Silver Glance at a depth of 300 feet. The mountain is very steep, and a foot in depth is gained for every foot driven. The Cross-Cut and Wootton were cut at a depth of 150 feet.

DOLORES COUNTY.

Mr. Linwood O. Towne, of Rico, sends us the following:

GRAND VIEW.—Mines are working as usual both at development and taking out ore, though snow has for a week or more prevented its shipment to the smelter of the company.

NEWMAN GROUP.—Work has been steadily progressing since early in October, and a force of 16 men is employed. The Swansea especially is yielding some fine ore.

LEILA DAVIS.—A contract has been let to do considerable work, which is now carried out.

CROSS.—After a shut-down during holidays, work has been resumed and ore shipped to the Grand View smelter.

PUZZLE EXTENSION.—The development of this property, which yielded so well during the year passed has been carried on this winter under the superintendence of Mr. George Higbee, of Cincinnati.

EAGLE COUNTY.

In mining, mostly assessment-work is doing at Taylor Hill, says a correspondent of the Leadville *Herald*, a large number of claims having been consolidated under the recent widening of claims, and these are worked.

The stamp-mill here is approaching completion. The management has recently bought the works of the Baily mill at Holy Cross, which was sold at public auction for the non-payment of taxes. They are to be hauled here and placed in position as soon as possible. These works cost, we are informed, $3000, and were sold for $300. It is probable that another mill will be erected next spring.

The Henry Dawson has begun to fill its bins, preparatory to making shipments. Whether it will send its ores to the mill here, or to Leadville for treatment, is as yet undetermined.

The New Era is to start up immediately, and some ore is to be shipped to Mr. Louis Sevier, of Leadville, who has erected a mill for the treatment of low-grade ores, upon a process of his own invention.

LAKE COUNTY.

The Leadville *Herald* gives the following information:

CATALPA.—The mine is looking much better and promises more for January than it returned during the preceding month. Since the first instant, the mine has already shipped 120 tons of fair ore, and regular shipments are made now, so that the yield during January will doubtless be fully up to expectations. The ore is obtained mainly from the old stopes and workings worked several years ago. These were filled, after the better ore was removed, with waste material. Much of this stuff runs from twenty-five to forty ounces in silver to the ton, and leaves good profits after sorting and shipping. The chief source of ore is the tract of ground surrounding the upper shaft.

CONSTANCE.—An important strike has been made. Twenty tons have already been shipped which ran forty dollars per ton. The mineral differs from most Leadville ores, carrying a considerable quantity of native silver, which is an exception to the minerals of this district.

CRESCENT.—The grade of the ore sent to the smelters averaged from thirty to forty ounces in silver to the ton, and carried about twenty-five per cent in lead. The ore shipped from the mine is obtained principally from a block of ground between the third and fourth levels which had not been penetrated since the purchase of the property from August R. Meyer & Co. three years ago. It covers an area of probably fifty by one hundred feet, and presents indications of disclosing considerable pay mineral. The most important work on the Crescent is a new shaft which has been sunk within the past ten days. The shaft is situated near the southwestern corner of the claim and has been sunk to a depth of forty feet.

EVENING STAR.—The mine continues making irregular shipments of ore, the mineral being secured in gleaning through the old workings of the property. The sinking of the upper shaft is advancing at a satisfactory pace, and a depth of about 335 feet has been attained. The first water has been encountered, though in small quantity. The Cornish pumps for this shaft are all in readiness to be placed in position as soon as sufficient water is encountered to necessitate their use.

FLORENCE.—Developments at this mine, on Printer Boy Hill, continue to improve the general prospect of this portion of the Carbonate camp. No attention is paid to the shipment of any large quantities of ore. The appearance of the mine is very satisfactory, showing considerable lead ore of fine smelting quality, also chlorides and free gold. Besides the main pay-streak, which seems to cling to the roof, or porphyry, there is any quantity of iron vein-matter, which all carries gold that might be made to pay by an ordinary gold mill, but no experiments have so far been made for this object.

MORNING STAR.—These mines, so far this year, have made an average daily production of forty-three and a half tons of ore a day. The bulk of this mineral is extracted from the McHarg shaft. Some ore of very high grade is also extracted from the workings contiguous to the Kitchen shaft, but in limited quantities. The portions of the Morning Star mine embracing the senior workings, with the exception of those surrounding the Kitchen shaft, are not looking particularly well. They are producing very little, and the prospects of new resources of any considerable extent being opened are not very flattering. The ground around the McHarg shaft is, however, prolific in fine carbonate ore, distributed regularly and generously over quite a large area. On this section of the property, heavy drifts can be made for quite a long time to come, without materially diminishing the resources which it unquestionably contains.

NELLIE S.—The lessees working this mine, situated on Printer Boy Hill, for many months past, have suspended operations, failing any longer to make the property pay.

WARD MILL.—Mr. Reed, who has been operating this concentrating mill, situated in Big Evans Gulch, opposite the Fryer Hill smelter, has closed down, and will not resume again till next spring. The severity of the weather has caused so much difficulty with the water that the establishment could not be kept running at a profit.

OURAY COUNTY.

NORFOLK & OURAY.—The result of the stockholders' meeting will be in all probability that the work on the Mineral Farm will be concentrated upon the claim, Forest Belle, a lead carrying galena and gray copper, and appearing to be the most promising of all those upon the farm, and that a contract for 100 feet of work or more upon this will be let immediately.

LA PLATA COUNTY.

NEW YORK & SAN JUAN.—The following statement gives the amount of ore received by this smelter at Durango from July 1st to December 1st, 1883. Prior to July 1st, the works were not in operation: Number of tons of ore received 2829; assay value, gold, 322 ounces; silver, 125,674 ounces; number of tons of lead, 872. The total value of the above, on a basis of $20 per ounce for gold, $1.10 per ounce for silver, and lead at $4 per hundred, would give $214,504.

SILVERADO.—This copper mining company owns several properties on the West Dolores. The Belcher ore assays 34 per cent in copper, which lies in a blanket vein 3½ feet wide. The Hatteras has a 32-inch vein, the mineral from which assays 28 per cent copper. A four-inch streak of gray copper runs 56 ounces in silver. The Dixie, 38-inch vein, runs 68 per cent in copper. Assays from the Sultana two-foot vein give 31 per cent copper. A chemical analysis on the ore from the Delta returned 72 per cent copper, 16 ounces in silver, and

a trace in gold. A mill-run on 100 pounds returned 43 per cent copper and eight ounces in silver. A mill-run on 160 pounds taken across the 13 feet of vein-matter returned 25 per cent copper and six ounces in silver. The character of this ore is copper carbonate, containing nuggets of copper glance.

PARK COUNTY.

According to local papers, the prospects of the Sovereign, Moose, Dolly Varden, Fanny Barret, Nestor, and other mines for the coming year are very favorable. Considerable money has been spent in the development of these mines, and the production this year will be very large.

DAKOTA.

FATHER DE SMET.—The report for the week ended January 8th shows ore extracted from first, second, and third levels 1890 tons. Ore milled, 1890 tons. Golden Gate south header, third level, advanced 7 feet. Justice rise, 5 feet.

MICHIGAN.

The following is a statement of the iron ore and pig-iron tonnage of the Marquette, Houghton & Ontonagon Railroad from January to December 31st, 1883, inclusive :

	Lake. Tons.	Local. Tons.	Total. Tons.
Ore	774,127	101,754	875,881
Pig-iron	10,145	200	10,345
Total ore and pig-iron	784,272	101,954	886,226

Following is a statement, in gross tons, of the amount of iron ore, pig-iron, and quartz carried over the peninsula division of the Chicago & Northwestern Railroad in 1883—the first column of figures showing shipments by lake from Escanaba, and the second the amount carried directly to furnaces :

	By lake.	By rail.	Total.
Total	1,424,299	61,440	1,485,739
Pig-iron by lake	....	....	4,483
Quartz, by lake	.....	.....	2,578
Grand total	.....	.....	1,492,800

Of the ore tonnage, 1,043,437 tons came from the mines of the Menominee range, and 442,302 tons from those of the Marquette District. A further analysis of the table shows that the mines of Menominee County are to be credited with 738,736 tons, those of Marquette County with 684,828 tons, and the Wisconsin mines with 62,175 tons. The mines in Marquette County, but usually set down as a part of the Menominee range, are credited in the foregoing table with an output of 242,526 tons.

The only Lake Superior iron mines which made an output of over 200,000 tons last year were the Chapin, the Cleveland, and the Lake Superior, the combined shipments of which amounted to 684,678 gross tons—the output of the Chapin being 265,830, and of the Cleveland 218,049 tons. The Cleveland output is the largest ever made by that mine in any one year.

DETROIT.—The original opening, from which the 1882 product was mined, was abandoned early in the past year, and since then working-shafts have been sunk and connected, new machinery put in, and the mine may now be said to be just fairly in condition for the beginning of active mining operations. The product for 1883 amounts to 12,314 tons.

IRON CLIFF.—The company shipped from those of its mines wrought last year ore as follows, in gross tons : Barnum, 62,752; Salisbury, 17,028; Foster, 10,029; Perry, 3138. Total, 92,947.

NORTHWESTERN.—This mine shipped 7147 tons last year, principally a clean blue ore, which gives excellent satisfaction to furnace-men. The product was taken out in the process of preparing the mine for further work.

PENN.—This iron company reports the product of the past year to have been 238,143 tons. Of this, the Norway mine produced 114,963 ; the Vulcan, 60,768 ; the East Vulcan, 18,784 ; the Cyclops, 22,675 ; the Quinnesec, 20,953.

MINNESOTA.

MINNESOTA IRON COMPANY.—This syndicate has just been formed by Ohio, Minnesota, and Pennsylvania capitalists. The company has bought 22,680 acres of land in St. Louis County, and has already opened six mines.

MONTANA.

JEFFERSON COUNTY.

The placer diggings on Upper Indian Creek are drifting diggings, and for drifting purposes these mines are comparatively inexhaustible, according to the Helena *Independent*. There are several miles of such diggings in the bed of Upper Indian Creek, and there are only some fifteen miners engaged in drifting. A large portion of this ground is unclaimed, so that companies of miners might start in almost anywhere and find a winter's job drifting, which could be washed up in the spring. The ground is somewhat spotted. There are often rich streaks paying from $30 to $50 per day to the man, while occasionally barren places are found with little or no pay upon bed-rock. The general average, however, will pay from $3 to $5 a day.

LEWIS & CLARKE COUNTY.

BOSTON & MONTANA.—At the Gloster, every thing is running smoothly. Thirty-five pounds of gold retort, the result of the first run of the new mill, were recently brought to Helena. This, it is stated, was only a partial clean-up.

EMPIRE.—The owners have bonded the mine and mill-site near Marysville for $65,000 to the London Mercantile Association (Limited).

GARFIELD.—The case of this company against Iver Wulf (who jumped the mine about a year ago) has been decided in favor of the plaintiffs by the district court at Helena.

HELENA MINING AND REDUCTION COMPANY.—The machinery is getting into position in the new concentrating-works this side of Wickes. The daily output of the works before the first of February will be fifty tons of concentrates and the product of twenty tons of ore milled at the old works at Wickes.

MONTANA.—Work is crowded on the air-compressor building, tramway, and grade for this company (formerly the Drum Lummon), and in one month or six weeks, should the weather continue favorable, over 500 tons of first-class machinery will be in motion on this property.

MADISON COUNTY.

A number of mines in the vicinity of Virginia City are worked, among them the Bell, Way-Up, U. S. Grant, Prospect, Nantucket, Almeda, and many other lodes ; and as the Virginia City Reduction Company intends to add ten or fifteen stamps to those already in operation, it will give an impetus to the full development of those mines. The erection of other mills has also been talked of for next summer in this vicinity.

On Wisconsin Creek, about four miles below Sheridan and about twenty miles from Virginia City, there have been smelting-works erected by Mr. S. G. Jones and others, which will be in operation next spring.

SILVER BOW COUNTY—SUMMIT VALLEY DISTRICT.

ANACONDA.—This company began shipping its ore for the first time over the Northern Pacific to St. Paul, January 10th, whence it will go to New York and Swansea. Seventy tons will be sent as a starter. The shipments of the company during the present winter will be comparatively small and will probably not exceed 2000 tons per month. Owing to the scarcity of mining timbers and the condition of the roads, the extraction of the ore from the mine will not be pushed. In the spring, however, high-grade ore will be hoisted from the Anaconda and sent to Garrison at such a rate that it will become the most important shipping point between the eastern and western termini of the Northern Pacific road.

BELL.—Some very fine ore is raised from the 400 northwest drift, upon which the smelter is expected to start up soon.

COLUSA.—Some high-grade copper-silver ore is raised from the 400-foot level of this mine. A large shipment of ore is making to Swansea, Wales.

LEXINGTON.—The bullion production for the past year amounts to : Gold, $162,619 ; silver, $1,125,705 ; total, $1,288,324. On and above the 400-foot level, the mine has been thoroughly and systematically explored. It is only recently that the 500-foot level has been opened to any extent, but enough work has been done to open from the south cross-cut a chute of ore of an ascertained length of sixty feet up to the present limit of the drift. This chute has a uniform width of five feet and samples from side to side and from one to the other seventy-five ounces in silver, besides some gold. It is one of the most important strikes yet made in the mine. So well does the mine look on the lower levels that preparations are now actively making to resume the sinking of the shaft. Work will soon begin, and as expeditiously as possible the shaft will be put down to the 800-foot level.

LIQUIDATOR —A new three-compartment shaft has been started, and when the new hoist is placed in position, the output of the mine will be largely increased.

MOULTON.—Some high-grade ore is mined from the 400-foot level. The 400-foot winze is making good progress.

NEVADA.

ESMERALDA COUNTY.

COPPER BASIN.—It is said that some New York parties intend to build a 10-ton smelter at Luning, on the Carson & Colorado Railroad, with which to work the Copper Basin ore. It will also work custom ore. The furnace has already been purchased, and there is a strong probability that work will soon begin.

MOUNT DIABLO.—There are no new developments to report. Work was stopped on the night of December 31st, and the mine closed down temporarily for the purpose of making repairs to the engine and putting in a new foundation for it. It will be several weeks before every thing is in shape to start work again, and meanwhile there are but a few men working on the foundation and on the surface of several of the claims. The ore on hand at Belleville has been milled, and the mill will be cleaned up as soon as possible.

STOREY COUNTY—COMSTOCK LODE.

At the north end, some prospecting is in progress, but the real business of exploring the 3100 level will not be commenced until the connection is made between the main north and south drifts on the 3100 level of the Union Consolidated. This will make a grand air-gallery extending through all the leading north end mines, and constituting a base from which exploring operations may be profitably carried on both to the east and west. Once the gallery is completed, cross-cuts will be run both east and west on the 3100 level of the Union Consolidated, and prospecting will be resumed on the 2900 level of the Mexican.

At the middle mines, things will soon be in a position to resume active operations. The new hydraulic pump at the 2600 level of the Challar-Norcross-Savage shaft has been successfully started up, and they will now be able to handle all the water with ease. The Hale & Norcross folks can proceed with their explorations without the frequent and troublesome interruptions to which they have heretofore been subjected.

At Gold Hill, the low stage of water in the Carson River still prevents the milling of ore and hinders full forces of men from being put to work in the several leading mines.

At the Alta, they are now cleaning out their main drifts on the 2150 level, preparatory to the resumption of active prospecting operations. The pumps have all been enlarged and are working well and smoothly. They now handle the water running at but six strokes per minute.

CONSOLIDATED VIRGINIA.—The report presented at the annual meeting, held in San Francisco, January 10th, shows that it has not been safe to attempt the reopening of the 1500, 1550, 1650, 1750, and 1950 levels, there still being indications of the existence of fire in these old stopes. The work on the 2300 level and connecting winze has been confined to the repairs necessary to maintain the system of ventilation and drainage. The southeast drift on the 2500 level has proved very difficult and expensive to run, on account of the heavy influx of very hot water encountered. The work in it has been theretore temporarily suspended. The work of sinking the Joint C. and C. winze below the 2700 level was resumed in April last, and it was sunk to a depth of 122 feet below this level, at which the influx of hot water became so strong that it was found necessary to suspend sinking for the present. An attempt was made to take up the bulk of the water at the 2800 level by cutting a pump station and running some drifts, but it proved unsuccessful. In July last, a south drift was started from a point in the joint California east cross-cut, 14 feet from the winze. This drift is now in 77 feet, and, unless prevented by water, will be driven ahead, forming the main lateral drift of this level. In September last, a chamber for a joint California winze, No. 2, was cut out, and a winze started down to a point in the joint California east drift, 360 feet east of the joint winze, down from the 2500 level. This winz is down 130 feet in a dry and favorable formation, and will be sunk to the 2900 level and connected with the main California south lateral drift on that level, forming a much needed airway and taking the natural ventilation down to that point. No work has been done in C. & C shaft during the past year except necessary repairs. The pumping and hoisting machinery is in good order. The old Consolidated Virginia shaft continues to be one of the main upcast shafts for the north end group of mines. Our explorations during the past year have been much interfered with by water encountered in the main south drifts of the 2500 and 2700 levels. This water however, has shown a material decrease in amount during the last few months.

NORTH CAROLINA.

HOOVER HILL.—It is officially reported that this company is meeting with much better success than heretofore. The monthly production has been running from 170 to 230 ounces gold. A considerable amount of prospecting and development-work is doing, and the mine is about paying expenses.

PENNSYLVANIA.

SUNBURY SMELTING-WORKS.—This company, which it is stated was financially embarassed, has been reorganized by a Philadelphia syndicate, with a capital of $100,000. The works will be sold soon by the sheriff and the new firm will buy it in. The old stockholders will be assigned stock to the amount held in the defunct one. The officers of the new company are : James Thatcher, President; J. M. Collingwood, Treasurer ; and A. H. Kidney, General Manager. An application for a charter, to bear the name of the Pennsylvania Smelting and Refining Company, has been filed. The treasurer has already $10,000. For the present, the Sunbury ore mine will not be worked, but the company will purchase and work Western ore. A refinery will be built.

SOUTH AMERICA.

BOLIVIA.

The Bolivian Congress has voted a sum of money for explorations in the Madre de Dios River. The region drained by this river, tradition asserts, is the wealthiest gold-bearing region in the world, and from its close vicinity the Peruvian Incas are said to have obtained the gold which was so abundant in the country at the time of the conquest.

SOUTH CAROLINA.

UNION COUNTY.

WEST.—In this mine, which is principally owned by Philadelphia capitalists, a rich strike of gold ore has recently been made. It is the intention now to run the twenty-stamp mill day and night; and it is thought that the ore just discovered will pay handsomely.

UTAH.

BEAVER COUNTY.

HORN-SILVER.—From three to four car-loads of bullion are shipped daily from the Horn-Silver smelter at Francklyn, and it carries a higher per cent of silver than formerly. The new and extensive strike in the lower levels, where Major Godspeed figured several millions in dividends to the fortunate stockholders, is constantly improving, and it is from this class of ore that bullion is produced. The mine is reported in better condition than ever, and the shipments from mine to smelter are uninterrupted.

SUMMIT COUNTY.

CRESCENT.—It is the intention of the company to place the mines in such condition this winter as to enable them to send out one hundred tons of ore per day. The ground is preparing for a tramway three and a half miles long, extending from the mines to the sampler. This tramway will be constructed of T-rail, and be operated by horse-power in taking the cars up; they will go down by gravity after being filled with ore. The road is to be ready early in the spring, and the concentrator and sampling-mills to be erected will be first-class in every respect.

GALVANIC.—This company, which has just been organized, proposes to engage in the business of silver mining, etc., in Utah Territory, with principal office in Salt Lake City. It is organized with a capital stock of 300,000 shares of a par value of $5 each, 50,000 of which are set apart as a working capital. The stock is principally held by Chicago capitalists, and the company has purchased the Mallory, Addie, Mayflower, and Jack Rabbit mines, all situated in Snake Creek Mining District. It is proposed to work these mines right along, a force of men being employed for all winter, which has already extracted considerable ore, a mill-run of which is sent to this market to test its value.

WISCONSIN.

HOWARD IRON COMPANY.—This company has recently been organized under the laws of Illinois. It has a leasehold on north ½ of southwest ¼ of section 33, 40-18, Florence County, Wis.; located one mile directly west of the Commonwealth mine. The ore is a hard, red hematite, equal in quantity to the best Commonwealth standard. The following improvements have been made on the property: Shaft, 62 feet deep, thoroughly timbered, with ladder-way, and built with a view to future use, in hoisting and ventilating. In addition, the property has been explored by test-pits, showing the ore to extend for a distance of over 300 feet, on the length of the vein. The shaft is located with the intention of going down in what was supposed to be a foot-wall, thus making the shaft entirely in rock and developing by cross-cutting the vein. The property is well located as regards shipping facilities, having the Chicago & Northwestern Railroad within three quarters of a mile, by an easy route, and the Wisconsin & Michigan within 500 feet of the shaft.

WYOMING.

Governor Hale, in his report to the Secretary of the Interior, states that the precious and superior metals are found widely distributed over Wyoming. The mines are not far developed as a rule, and the output of bullion is inconsiderable. Gold has been found in the Wind River, Seminole, Shoshone, Medicine Bow, Laramie, and other ranges of mountains. Silver has been found in the Snowy range of the sources of Green River, in the mountains near Cummins City, in the hills on the Platte River above Fort Laramie, at Rawhide Buttes, and on the Running Water. Copper is found at many places in the Medicine Bow, Seminole, and Ferris mountains, near Rawlins, in the Laramie range, at Hartville, Whalen Cañon, Rawhide, Running Water, and numerous other districts. Mines have been developed with great promise at Silver Crown, Hartville, and Rawhide. Iron lies in the Laramie range, north of Laramie City, at Rawlins, in the Seminole Mountains, and elsewhere. As yet, there have been no manufactures. Graphite is found in the hills north of Laramie City and northwest of Fort Laramie. Sulphur is found in large bodies south of Evanston. Soda is in "lakes" near Laramie City, in the Sweetwater Valley. In both localities, the deposits are about to be utilized in manufactures. Common salt of excellent quality is found in the unorganized county of Crook, west of Black Hills. Magnesia is found near Rock Creek. Fire-clay is found in many localities. Mica is found in the mountains northwest of Fort Laramie and in Albany County. Coal in vast quantities is found in almost every part of the territory, the veins being from four to forty feet in thickness. A great deal is taken out annually by the Union Pacific Company. Petroleum of the best lubricating kind is found in large quantities in the central parts of the territory. Granites, marbles, limestone, sandstone, and slates are found in great variety.

WYOMING.—This company has started the first smelter in the territory. The works were started December 7th, 1882, producing copper running 97 fine. The ores smelted were taken from the surface workings of the company's principal mine, the Sunrise, at that time only a prospect, and now but partially developed. About 4000 tons of ore, averaging 15 per cent, have been mined or quarried from these croppings, and 3500 tons have been smelted at the works at Fairbank. The output of copper bullion amounts to something over 1,000,000 pounds. Of coke, 850 tons, and of charcoal 10,000 bushels have been consumed. It is stated that the only drawback met with in the development of these and other mines situated in the vicinity of Hartville has been the great cost of hauling coke by wagon from Cheyenne by way of Fort Laramie; but as three railroads are now working their way to this point, this obstacle will soon be removed.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

GRANTED DECEMBER 4TH, 1883.

289,400. Furnace for Burning Culm and other Fine Fuel. Frank E. Fahrig, Scranton, Pa.
289,422. Brick-Machine. John A. Lafler, Albion, N. Y.
289,424. Hydrocarbon Burner for Furnaces. Leffert Lefferts, New York City.
289,524. Rolling-Mill Plant. William Garrett, Cleveland, Ohio.
289,535. Double-Acting Pump. Dauphin S. Hines, Brooklyn; William A. Perry, Bay Ridge; and Charles C. Worthington, Irvington, N. Y.
289,545. Apparatus for Separating Iron from Charcoal, etc. Dugald MacEachran, Greenock, County of Renfrew, Scotland.
289,559. Centrifugal Pump and Water-Wheel. Samuel S. Richardson, Happy Camp, Cal.
289,560. Water-Motor. Samuel S. Richardson, Happy Camp, Cal.
289,587. Method of and Apparatus for Reducing and Disintegrating Ores. Elijah Warne, Easton, Pa.
289,591. Furnace. Charles Henrey Wilson, Paducah, Ky.
289,595. Coal and Rock Drilling Machine. Thomas Aitken, Pittston, Pa.
289,605. Rolling-Mill. John H. Bickley, Dover, N. J.
289,634. Furnace. Wilson Ernst, Camden, N. J.
289,648. Pumping-Engine. Albert E. Hall and Milan W. Hall, Plainfield, N. J.
289,695. Grinding-Mill. John T. Obenchain, Logansport, Ind.
289,702. Miner's Candlestick. Cyrille Patenaude, Helena, Mont.
289,742. Mining-Machine. Henry Wilverth, St. Charles, Ky.
289,745. Coal-Mining Machine. Benjamin F. Asper, Pittsburg, Pa.
289,748. Suction Condenser for Steam-Pumps. Talmadge Blass, Millerton, N. Y., Assignor to William Angevine and George S. Frink, both of same place.
289,755. Process of Preparing Explosive Compounds. Silas R. Divine, Loch Sheldrake, N. Y., Assignor to the Rend Rock Powder Company, of New Jersey.
289,756 to 289,760. Explosive Compound. Silas R. Divine, Loch Sheldrake, N. Y., Assignor to the Rend Rock Powder Company, of New Jersey.
289,761. Method of Preparing Blasting-Cartridges. Silas R. Divine, Loch Sheldrake, and Addison C. Rand, New York City, Assignors to the Rend Rock Powder Company, of New Jersey.
289,762 and 289,763. Explosive Compound. Silas R. Divine, Loch Sheldrake, N. Y., Assignor to the Rend Rock Powder Company, of New Jersey.
289,764. Blasting-Cartridge. Silas R. Divine, Loch Sheldrake, N. Y., Assignor to the Rend Rock Powder Company, of New Jersey.
289,765. Composition for Preparing Explosive Compounds. Silas R. Divine, Loch Sheldrake, N. Y., Assignor to the Rend Rock Powder Company, of New Jersey.
289,769. Brick-Machine. William A. Graham, Carlisle, Pa.
289,781. Process of Obtaining Precious Metals from Ores by Amalgamation. Eugene N. Riotte, New York City.
289,785. Evaporating Apparatus. John Stuart, Traer, Iowa.
289,791. Dry-Ore Pulverizer and Concentrator. Adam Wingard, San Francisco, Cal.

REISSUE.

10,417. Supplying Locomotives with Coal. John B. Collin, Altoona, Pa.

GRANTED DECEMBER 11TH.

289,822. Rotary Engine. John P. Fletcher, New York City.
289,828. Geared Pumping-Engine. Harvey F. Gaskill, Lockport, N. Y.
289,842. Apparatus for Producing Gas. Erazm. J. Jerzmanowski, New York City.
289,887. Coke-Oven. Joseph Butler, Kennon, Ohio.
289,889. Brick-Machine. Martin Carroll, Chicago, Ill.
289,900. Protecting Iron Water-Pipes from Rust. Frederick Eaton, Los Angeles, Cal.
289,914. Process of Producing Combustible Gas. Erazm. J. Jerzmanowski, New York City.
289,938. Brick and Tile Kiln. John W. Souders and Joseph Prutzman, Muncie, Ind.
289,940. Lock for Self-Dumping Coal-Tubs. Gustavus Labertus Stuebner, Long Island City, N. Y.
289,945. Machine for Compressing Pulverized Substances. Otto E. Weber, Dresden, Saxony, Germany.
289,952. Hot-Blast for Blast-Furnaces. Charles Alger, Hudson, N. Y.
289,956. Process of Ornamenting Metals. Hermann Bauer, Schwäbisch-Gmünd, Germany, Assignor to William C. Edge, Newark, N. J.
289,963. Furnace. Virgil W. Blanchard, New York City.
290,008. Ore-Concentrator. Edward L. Doyle, Lynn, Mass., and George S. Burr, Montezuma, Colo.; said Burr Assignor of one half his right to said Doyle.
290,035. Rotary Engine. Albert H. Gleason, Wabash, Ind.
290,036. Ratchet-Wrench. Guillaume Gontier, Cognac, France.
290,037. Apparatus for Charging Blast-Furnaces. Frederick W. Gordon, Pittsburg, Pa.
290,053. Elevator-Bucket. Joseph A. Holmes, Greenland, N. H.
290,056. Method of Obtaining Rotating Centers of Emery and Polishing Wheels. Joseph D. Huntington, Chicago, Ill.
290,075. Portable Refining and Oxidizing Apparatus. Camille Leveque, Pouzin, France.
290,077. Apparatus for Compressing, Surfacing, and Straightening Bars, etc. John L. Lewis, Pittsburg, Pa.
290,115. Roasting and Smelting Furnace. Benjamin O. Russell, Denver, Colo.
290,125. Double-Acting Pump. Jacob Singler, St. Louis, Mo.
290,143. Mine-Railroad. John G. Thompson, Cuba, Ill.
290,148. Rotary Colter. Flavius J. Underwood, North Springfield, Mo.
290,182. Magnetic Apron-Cylinder for Ore-Separating Machines. Emory B. Hastings, Palmer, Mass., Assignor to the Hastings Concentrator Company, same place.
290,193. Evaporating-Pan. Williamson B. Seward, Bloomington, Ind.

GRANTED DECEMBER 18TH.

290,212. Retort-Furnace for Roasting Ores. Cummings Cherry, Sr., Chicago, Ill.
290,213. Process of Desulphurizing and Purifying Ores Preparatory to Smelting. Cummings Cherry, Sr., Chicago, Ill.
290,214. Apparatus for Roasting and Preparing Ores for Smelting. Cummings Cherry, Sr., Chicago, Ill.
290,215. Process of Purifying Iron Ore Preparatory to Smelting. Cummings Cherry, Sr., Chicago, Ill.
290,242. Automatic Friction Feeding Device for Drilling and Boring-Machines. James J. Kirby, Clinton, Iowa.
290,258. Apparatus for Collecting and Saving Metallic Particles. Jonathan Miller, Concord, N. H.
290,259. Method and Apparatus Employed in Extracting Gold and Silver from their Ores and in Forming Amalgams. Bernard Charles Molloy, London, England.
290,270. Steam-Boiler Furnace. Andrew Ritter, Jr., Chicago, Ill., Assignor of two thirds to A. F. Noble and James C. Pollock, both of same place.
290,298. Dumping-Car. George J. Wheelock, Oakland, Assignor of one half to Napoleon Beauregard, San Francisco, Cal.
290,309. Rock-Drill. Edwin A. Armstrong, Detroit, Mich.
290,343. Process of Reducing and Smelting Metals and Apparatus therefor. John Tyler Morgan, Selma, Ala., and Henry Franklin Hayden and John Hardie Morgan, Washington, D. C.
290,368. Composition for Sharpening and Grinding Metals. Alfred W. Sperry, Hartford, Conn., Assignor to himself and Thomas J. Montgomery, Boston, Mass.
290,423. Compound for Tempering and Hardening Iron. Michael L. Healy, Republic, Mich., Assignor to himself, Carl A. W. Weinberg, Cyrus M. Babcock, and Gustaf Bergstrom, all of same place.
290,444. Manufacture of White Lead. John C. Martin, Richmond, County of Surrey, England.
290,449. Steam-Hammer. Edward B. Meatyard, Lake Geneva, Wis.
290,482. Rock-Breaker and Dredger. Charles A. Scanlan, Charleston, S. C., Assignor of one third to John G. Smith, same place.
290,510. Miner's Safety-Lamp. John Lloyd Williams, Shenandoah, Pa.
290,548. Process of Extracting Metals. Alexis Drouin, Paris, France.
290,573. Chimney for Furnaces. Daniel McBride Graham, Chicago, Ill.
290,626. Steel-Ingot Mold. Frank Neal Beazle, Pittsburg, Pa.
290,629. Process of Smelting Refractory Ores. John Campbell, San Francisco, Cal.

GRANTED DECEMBER 25TH.

290,700. Apparatus for Assorting Straight and Crooked Wire. James A. Morton, New Bedford, Mass., Assignor to the Morse Twist Drill and Machine Company, same place.
290,736. Machine for Sanding Brick-Molds. Warren Brower, Newburg, N. Y.
290,764. Air-Compressor. Thomas F. Freeman, Brooklyn, Assignor to William Koch, New York City.
290,802. Apparatus for Roasting and Amalgamating Ores. Samuel George Rollins, Boston, Mass.
290,815. Amalgamator. John McL. Thompson, Trumansburg, N. Y.
290,825. Concentrator. Charles H. Wetzel, Butte City, Mont., Assignor of one half to Ernest Rummelmeyer, same place.
290,847. Machine for Sanding Brick-Molds. James A. Buck, Crescent, N. Y., Assignor of one half to Sylvester Newton, Albert H. Newton, and Andrew Newton, all of same place.
290,874. Pulverizing-Machine. Hermann Bernhard Feldman, Philadelphia, Pa., Assignor to Joseph R. Tasker, same place.
290,939. Brick-Kiln. Thaddeus S. Smith, St. Louis, Mo.
290,946. Watchman's Time-Detector. Louis Van Bunnen, Brussels, Belgium.
290,989. Apparatus for the Construction of Tunnels. W. Ranson Kirk, Fort Scott, Kan., Assignor of one half to W. J. Moore, same place.
291,012. Mining-Machine. Xavier Kern, Jr., and John Hammer, West Brookfield, Ohio.

FINANCIAL.

Gold and Silver Stocks.

NEW YORK, Friday Evening, Jan. 18.

The Bodie stocks were the principal feature of interest in the mining market this week, and they were actively dealt in at very strong prices. Bodie to-day reached its highest price, $12.50. Telegraphic dispatches from Bodie state there has been a very rich strike made in the Bodie and Standard mines, but no definite information on the subject has reached us yet. Bulwer was also very strong. The company has declared a dividend of ten cents a share.

Outside of the Bodie stocks, there was but little of interest. The market was strong in sympathy with the advance of the Bodies, but it was dull. Horn-Silver gained a little strength, and Iron Silver was also stronger. Sierra Grande showed some strength under a moderate business. The fancy low-priced stocks were almost neglected in the rush for the Bodies. Robinson gained a little strength, but there was no material change in the price of the remainder that were dealt in. A complete summary of the market is given below. The total number of shares sold aggregates 74,890, as against 78,730 last week.

The Bodie stocks were very strong, and were actively dealt in. Bodie Consolidated was the strongest and most active on the list, selling from $4@$12.50. Bulwer rose under the impetus of a large business, selling from 53c.@$1.75. Standard shared in the general upward movement, selling from $5.50@$7.25. Goodshaw was also active and very strong; it sold from 5@50c. Tioga advanced from 35@50c. North Standard rallied from 13@23c. under a small business. Bechtel sold at 5c. early in the week.

The Comstock shares were quiet and steady. California sold from 7@11c., with a small business. Consolidated Virginia was quiet and steady, selling from 26@30c. Sierra Nevada was irregular, under a small business, selling from $2.80@$2.50@$2.70. Union Consolidated was quiet and steady, selling from $3.40@$3.50, assessment paid, and from $2.40@$2.50 assessment unpaid. Hale & Norcross sold at $1.85, and Savage at 90c. Sutro Tunnel was quiet and strong at 15@17c.

The Leadville stocks were but moderately dealt in and were steady. Amie sold from 10@9c. under a small business. Chrysolite was quiet and steady at $1.10@$1.15. Dunkin sold from 22@20c. Iron Silver was strong and was actively dealt in; it sold from $1.85@$2.15@$2.10. Leadville was quiet and steady, selling from 45@49c. Little Chief was moderately dealt in at strong prices; it sold from 60@58c. dividend unpaid, and from 45@50c. dividend paid. Little Pittsburg was quite strong to-day; it sold from 45@60c.

The Tuscarora stocks were almost neglected. Belle Isle sold at 22c. assessment paid, and at 10c. assessment unpaid. Navajo was quiet and steady, selling from $2@$2.25@$2.20. North Belle Isle sold at 20c.

In the miscellaneous list, Eureka was weak under a small business, selling from $2@$1.75. Green Mountain was quiet and steady, selling from $1.95@$1.90. Horn-Silver was strong under a fair business; it sold from $6.50@$6.88@$6.75. Northern Belle was very quiet at 50c. Robinson Consolidated was a little stronger, but the dealings in it were very small; it sold from 22@30c. Sierra Grande was active and strong, selling from 74@85@80c. Silver King lost its strength of a week ago, and was quite weak; it declined from $8 to $7.

Barcelona was quiet and steady at 12@13c. Central Arizona sold at 20c., under a small business. Decatur sold at 3@4c., and Eastern Oregon at 8c. The dealings in both were very small. Harlem was quiet and irregular, selling from 9@13c. Sonora Consolidated was very quiet at steady prices; it sold from 9@10c.

MEETINGS.

The Bellevue Mining Company, No. 40 Broadway, Room 51, New York City. Annual meeting of stockholders and election of trustees, January 24th.

The Copper Prince Mining Company, No. 3 Broad street, Room 62, New York City. Annual meeting of stockholders and election of trustees, February 4th, at two o'clock P.M.

The Pantano Gold and Silver Mining Company, No. 137 Broadway, New York City. Annual meeting of stockholders and election of trustees, January 26th, at two o'clock P.M.

The Ray Copper Company, Nos. 34 and 36 Thomas street, New York City. Annual meeting of stockholders and election of trustees, January 28th, at one o'clock P.M.

The Relief Silver Mining Company, Room 60, Morse Building, New York City. Adjourned meeting of stockholders, January 30th, at four o'clock P.M.

The Socorro Milling and Mining Company, No. 3 Broad street, Room 32, New York City. Special meeting of stockholders for the purpose of disposing of the interests of the company in New Mexico, and such other business as may be submitted, January 28th, at one o'clock P.M.

The Torrence Mining Company, No. 3 Broad street, Room 32, New York City. Special meeting of stockholders for the purpose of disposing of the interests of the company in New Mexico, and such other business as may be submitted, January 28th, at half-past one o'clock P.M.

The Wide West Mining Company, No. 59 Wall street, Room B, New York City. Special meeting of stockholders for the purpose of electing trustees, February 4th, at twelve o'clock M.

DIVIDENDS.

The Bonanza King Consolidated Mining Company, of California, has declared a dividend (No. 2) of twenty-five cents per share, payable January 15th.

The Bulwer Consolidated Mining Company, of California, has declared a dividend of ten cents per share, payable January 31st, at the office of the Farmers' Loan and Trust Company.

The Calumet & Hecla Mining Company, of Michigan, has declared a dividend of $5 per share, payable February 15th, to stockholders of record January 12th.

The Derbec Blue Gravel Mining Company, of California, has declared a dividend (No. 1) of ten cents per share, payable January 14th.

The Diamond Coal Land Company announces a quarterly dividend of $2 per share, payable on demand.

The Homestake Mining Company, of Dakota, has declared a dividend (No. 65) of twenty cents per share, payable January 25th.

The Kentuck Mining Company, of Nevada, has declared a dividend (No. 42) of ten cents per share, payable January 18th.

The Plymouth Consolidated Mining Company, of California, has declared a dividend of 50 cents per share, or $50,000. Total dividends to date, $400,000.

PIPE LINE CERTIFICATES.

Messrs. Watson & Gibson, petroleum brokers, No. 49 Broadway, report as follows for the past week:

On Saturday last, the market opened at $1.11⅛, and closed at $1.12¼ bid. During the early morning of the 14th, it sold at $1.12¼, but then started on the downward track, from which there was no important reaction until Wednesday, the 16th, when it touched $1.07. The immediate cause of the decline was the opening of a very good well, yielding 500 barrels daily, the McKinney well, in the Sheffield District, north of Cooper tract. Near this well, was the Shank & Emery, and until the doubt as to its character was settled, it exercised a depressing influence. The report late Tuesday night that this well was a small affair served to turn the tide, scaring the shorts to cover, and under the influence of this and fears of a squeeze in certificates, which were scarce, the market sold up on Wednesday from $1.07 to $1.09¾. Thursday, sales were made at $1.10½, but during the afternoon the selling fever again took possession of the crowd, and oil was sold right and left, and the close was at $1.08⅝. Opening steady this morning at $1.08⅝, it sold off to $1.07¾, but toward the close it became very strong at $1.09⅝ bid.

The McKinney well may open up a small pool of new territory, but it is limited at best, as it is surrounded by exhausted or sterile territory.

Refined oil is steady at 9½. Certificates of crude this week have been scarce, and the indications are, that the short interest will serve to cause an advance.

The following table gives the quotations and sales at the New York Mining Stock and National Petroleum Exchange:

	Opening.	Highest.	Lowest.	Closing.	Sales.
Jan. 12	$1.11⅛	$1.12¼	$1.11¼	$1.12¼	4,162,000
14	1.12⅜	1.12¼	1.09⅜	1.09¼	8,636,000
15	1.09¼	1.09⅜	1.07⅜	1.07⅜	10,492,000
16	1.07	1.09¼	1.07	1.08¾	12,869,000
17	1.10½	1.10½	1.08	1.08⅝	7,511,000
18	1.08⅝	1.09⅞	1.07¾	1.09⅝	10,345,000
Total sales					54,015,000

SAN FRANCISCO MINING STOCK QUOTATIONS.

Daily Range of Prices for the Week.

NAME OF COMPANY.	CLOSING QUOTATIONS. Jan. 11.	Jan. 12.	Jan. 14.	Jan. 15.	Jan. 16.	Jan. 17.
Albion						
Alpha						
Alta	$2¼	$2¼	$2¼	$2⅛		$1⅝
Argenta						
Bechtel						
Belcher				1⅛	.95	1
Belle Isle			.10	.10	.10	.10
Best & Belcher	2⅞	2¾	2¾	2⅝	2¾	2⅞
Bodie	4¼	4½	5⅛	5⅝	7¾	12½
Bullion						
Bulwer						
California			.10	.05		.05
Challar	2½	2½	2⅜	2¼	2¼	2⅛
Con. Virginia	.25	.30	.30	.30	.30	.30
Crown Point				.95		1
Elko Cons						
Eureka Cons	1¾	1⅞				
Exchequer						
Gould & Curry	1⅛	1¾	1¾	1¾	1⅛	2⅛
Grand Prize		.15	.15	.15	.15	.15
Hale & Norcross	2¼	2	2	1⅞	1⅞	2⅛
Independence						
Martin White						
Mexican	2	2	2	1¾	1¾	2⅛
Mono						
Mount Diablo			2	2	2	2⅛
Navajo	2⅛	2	2	2⅛	2	2¼
Northern Belle					.45	.50
North Belle Isle						
Ophir	3¾	3¾	3⅝	3⅝	3½	3½
Overman						
Potosi	1	.90	.35	.90	.90	1
Savage	1	1	.95	.90	.90	1
Scorpion						
Sierra Nevada	3	2⅞	2¾	2⅛	2⅛	2⅛
Silver King						
Tip Top						
Union Cons	2⅝	2½	2½	2⅜	2⅜	2⅝
Utah			1⅛	1⅛		1¼
Wales Cons						
Yellow Jacket	2¼	2⅜	2¼	2¼	2¼	2⅛

The following are the financial balances of the various mining companies on January 1st:

CASH ON HAND.

Alta	$2,773.04	Challar	$56,126.34
Alpha Con	224.18	§Gould & Curry	28,648.33
Andes	9,471.31	Mono	2,095.19
Argenta	2,362.17	Martin White	582.91
*Belcher	17,803.08	Occidental	5,122.29
Booker Con	101.38	Potosi	12,274.57
Bulwer	7,522.95	Sierra Nevada	21,294.67
Best & Belcher	12,774.32	Savage	19,940.11
Bodie Con	16,286.31	Standard	95,372.25
Benton Con	10,002.67	Summit	629.86
†Con. Virginia	49,243.76	Tioga Con	706.64
‡California	544.75	‖Utah	117.37
Crown Point	22,756.31		

INDEBTEDNESS.

Double Standard	$1.09
Grand Prize	16,276.21
¶Hale & Norcross	1,382.33
Lady Washington Con	4,121.96
Mexican	4,657.57
Northern Belle	10,244.10

* Due Sutro Tunnel Company, $10,920.
† Monthly expenses at mine; amount unknown.
‡ Overdraft at Nevada Bank, $8792.34.
§ Amount due on assessment No. 46, $3531.12.
‖ Overdraft at bank, $2334.38.
¶ To collect on assessment less overdraft in bank, $9882.17.

Albion indebtedness exact amount not yet known; approximate, $260,000.

Day, outstanding drafts, $8500; overdraft, $1899.75; bills payable, $76,567.57.

Copper and Silver Stocks.

Reported by C. H. Smith, 15 Congress street, Boston Stock Broker and Member of the Boston Mining and Stock Exchanges.

BOSTON, January 17.

There has been no special feature in the market for mining stocks the past week. There is very little doing, and prices are inclined to drop, and we see no indications of any increased activity or advance in the near future. Ingot copper is dull, and unless an advance should take place soon, it will not be reasonable to expect any great activity in the copper stocks the present season. Calumet & Hecla sold ex dividend this week at $233@$234, and closed at $233, which is a decline of $1. Franklin continues steady and in fair demand at $9⅞. Quincy is lower, and declined from $48 to $46, on sales of less than 100 shares. Osceola was also heavy, and declined from

$17 to $16¼. Pewabic, steady at $1⅛@$1¾. Huron declined from $1½ to $1¼.

In silver stocks, 2000 shares of Catalpa sold at 30c., and 50 shares of Bonanza at $1.⅝, which comprises all the sales of this class at the regular Stock Board for the week.

At the Boston Mining and Stock Exchange, there has been some activity in Bowman Silver, which advanced at one time to 19c., but subsequently declined to 15c. sales, closing at 16c. and bid. Empire is also becoming more prominent in the dealings at the Board, and shows an advance to 33c., sales and bid this afternoon. The reports from the mine are satisfactory, and it is expected that higher prices will prevail. Other stocks dealt in are dull and without feature.

3 P.M.—The market this afternoon shows no change in the situation, and prices are fairly steady.

BULLION MARKET.

NEW YORK, Friday Evening, Jan. 18.

BULLION PRODUCTION FOR 1883.

We give below a statement showing the latest bullion shipments. These are officially obtained from the companies, where that is possible; and where official statements can not be procured, we take the latest shipments published in those papers nearest to the mines reported. The table gives the amount shipped for the week up to the date given, as well as the aggregate shipments to such date from the first of January, 1883.

The shipments of silver bullion are valued at $1.29·29 per ounce troy; gold at the standard $20.67 per ounce troy. The actual value of the silver in the following table is therefore subject to a discount, depending on the market price of silver. If the price of silver be counted at $1.11 an ounce, which has for some months been about its average value, the following figures, where they relate to silver bullion, should be diminished by about 14⅛ per cent, to arrive at actual value.

MINES.	States.	Month of December.	Year from Jan. 1st, 1883.
*Alice, G. S.	Mont.	.....	$885,934
*Alta-Montana, G. L. S.	"	.....	$10,625
*Belmont	"	——	12,604
Bodie, G. S.	Cal.	.....	199,859
Bodie Tunnel, G.	"	.....	52,742
*Bonanza King, G.	"	.....	426,967
*Boston & Montana, G.	Mont.	.....	140,323
California, G.	Colo.	18,000	222,359
*Central Arizona, S.	Ariz.	.....	35,845
*Christy, S.	Utah.	.....	236,600
*Chrysolite, S. L.	Colo.	.....	345,403
*Consolidated Bobtail, G	Colo.	.....	71,227
†Contention, S.	Ariz.	.....	854,886
Crescent, G. S. L.	Utah.	.....	266,498
*Custer, G. S.	Idaho.	.....	43,572
*Deadwood-Terra, G.	Dak.	.....	388,562
*Derbec Blue Gravel, G. S.	Cal.	19,304	147,323
Dunkin, S. L.	Colo.	.....	49,250
Evening Star, S. L.	Colo.	.....	47,061
*Father de Smet, G.	Dak.	15,224	340,461
Freeland, G. S. C.	Colo.	.....	208,464
*Frisco M. and S. Co., G. S. L.	Utah.	.....	$77,084
*Granite Mountain, S.	Mont.	——	323,523
Gunnell, S.	Colo.	.....	58,828
*Haile, G.	S. C.	.....	37,942
*Head Center Consolidated	Ariz.	.....	45,340
*Head Center and Tranquillity	Ariz.	.....	89,108
*Hecla Consolidated, G. S. L.	Mont.	**	633,979
*Homestake, G.	Dak.	.....	866,709
*Hope, S.	Mont.	——	82,060
Horn-Silver, S. L.	Utah.	276,000	3,253,200
*Howell S. and Mg. Co., G. S. L.	Ariz.	11,238	205,190
Idaho, G.	Cal.	.....	150,642
*Independence, G. S.	Nev.	.....	32,991
*Iron Silver, S. L.	Colo.	.....	1,031,952
*Jocuistita, S.	Mex.	.....	‡258,959
*Kentuck, G. S.	Nev.	.....	2) 550
*Lexington, S.	Mont.	114,638	1,288,323
*Little Pittsburg, S. L.	Colo.	.....	87,552
*Marguerite, G.	Cal.	.....	74,622
*Martin White, G. S.	Nev.	.....	136,317
Morning Star, S. D.	Colo.	.....	84,428
Mount Diablo.	Nev.	.....	468,242
*Navajo, G. S.	"	.....	411,642
*North Belle Isle	"	.....	2,153
Northern Belle, S.	"	.....	569,607
*Ontario, S. L.	Utah.	.....	1,807,178
*Oxford, G.	N. S.	.....	54,055
*Phœnix, G.	N. C.	.....	21,009
*Pinal Consolidated, S. L.	Ariz.	.....	181,485
*Plymouth Consolidated, G.	Cal.	76,714	527,170
*Satemo, G.	N. S.	.....	2,500
*Silver Bow, G. S.	Mont.	.....	203,947
*Silver Cord, G. S. L.	Colo.	.....	972,567
Silver King, S.	Ariz.	.....	367,802
*South Yuba, G.	Cal.	1,876	39,148
Standard, G.	Cal.	.....	1,034,685
Star, S.	Nev.	.....	27,095
*Stormont, S.	Utah.	.....	232,638
Syndicate, G.	Cal.	.....	66,238
Tintic M. and M. Co.	Utah.	6,680	43,223
*Tip Top, S.	Ariz.	——	37,868
*Tombstone, G. S. L.	"	.....	664,618
United Gregory, G.	Colo.	——	98,000
Wyoming Consolidated.	Cal.	.....	31,541
Yellow Jacket, S.	Nev.	.....	265,885
Total amount of shipments to date			$21,954,151

* Official. †Net value. ‡ Assay value. §Not including value of lead. *G. Gold. S. Silver. L. Lead.* The dash (——) indicates that no shipments have been made in the month named. ** Silver valued at $1.10 per ounce.

The India exchanges on London are again lower, but the firmness of our sterling exchange market has kept rates for silver here at about previous postings. The indications are toward rather lower prices.

DATE	London. Pence.	N. Y. Cents.	DATE.	London. Pence.	N. Y. Cents.
Jan. 12	50¾	110⅝	Jan. 16	50⅞	110⅞
14	50 13-16	110⅝	17	50⅞	110⅞
15	50 13-16	110¾	18	50¾	110¾

Foreign Bank Statements.—The governors of the Bank of England, at their regular weekly meeting, made no change in the bank's minimum rate of discount, and it remains at 3 per cent. During the week, the bank gained £18,000 bullion, and the proportion of its reserve to its liabilities was increased from 36¼ to 40⅝ per cent, against 40⅝ per cent at this date last year. The weekly statement of the Bank of France shows a decrease of 1,025,000 francs gold, and a decrease of 400,000 francs silver. The Bank of England lost £233,000 bullion on balance.

METALS.

NEW YORK, Friday Evening, Jan. 18.

Copper.—Odd lots of Lake are picked up at 14⅞c., while 15c. is nominally the price. The market is extremely quiet, with no features to indicate in what direction the current is setting. Other brands range between 14c. and 14¾c.

London cables £56 17s. 6d. for Chili Bars, and £64 for Best Selected.

Tin.—Considerable business has been done during the week, in the aggregate about 400 or 500 tons of spot and futures, some spot selling at 19½c., and March futures at 18⅝c. At the close, 18⅝c. is freely bid, and 18⅞@19c. asked. London cables at the close, £83 5s.

Lead.—As anticipated in our last, the sudden rise has had the effect upon buyers of driving them out of the market, after some of them had covered their most urgent requirements. Some odd lots have been in the market at 4·30 and 4⅝c., but the great bulk of the lead is firmly held at 4·50c. There has been no wholesale business, nor will there be until consumers are forced by absolute necessity to buy. It is certain that holders are in earnest, and they have the power and the backing to make those who have held off so long pay, temporarily at least, round figures for any lead they may want. The immediate future seems secure to that extent. Abroad, lead has followed suit, and it can not be laid down here for much less than 4·70c. Quotations by cable are £11 17s. 6d.

From St. Louis, Messrs. John Wahl & Co. telegraph to us as follows:

Our market is firm. We report sales of 190 tons of Common at 4c. There have been no sales of Refined. Common is now held at 4·12½c.

Messrs. Everett & Post, of Chicago, telegraph us to-day:

Our market is quiet and dull, prices being unchanged. The demand is principally from the East. Offerings, however, are very light. The price is nominally 4c.

Spelter.—The market is very dull, and we hear of sales of Common Domestic at 4·25c. We quote 4·25@4·50c., with Glendale and other preferred brands at 4·90c.

Antimony.—The market here has passed into firm hands, and has risen in sympathy with the English markets. We quote Hallett's, 10¾@11c.; and Cookson's, 11½@12c.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Jan. 18.

American Pig.—During the week, about 30,000 tons of foundry pig have been placed for season contracts at $19 and $20 for Nos. 2 and 1 respectively, while small lots are held at 50c. more. It appears that buyers do not look for any material reduction in prices, and as the number of sellers is less than in former years, those who are offering pig report an increase in the size of orders of from 25 to 50 per cent. It does not follow from this, however, that the demand has taken any sudden jump. Forge Iron is quiet. We quote: Foundry No. 1, $20@$22.50; No. 2, $18.50@$19.50; and Gray Forge, $17.50@$19. Bessemer pig has been quiet at $20 asked. There have been several sales of Spiegeleisen at $28.50 ex ship, for 20 per cent, which we quote.

There have been no transactions in iron at the Metal Exchange.

Scotch Pig.—The advance of prices in Glasgow has reacted on this market, while holders are firm.

We quote ex ship and to arrive: Coltness, $22.50@$23.50; Langloan, $23@$23.50; Summerlee, $23; Eglinton, $20.50@$21; and Dalmellington, $20.50.

At the Exchange, the following cable quotations were received to-day: Coltness, 57s.; Langloan, 55s.; Gartsherrie, 54s.; Eglinton, at Ardrossan, 47s.; and Warrants, 44s. 6d.

Steel Rails.—The market has continued to maintain its attitude of greater firmness, and $35 is now the lowest figure obtainable for small lots, early delivery, while some mills ask $36 at mill.

Old Material.—The market is quiet at $21.50@$22.50 for old Ts.

Philadelphia. January 17.

[From our Special Correspondent.]

Pig-Iron.—The past week, contrary to the expectations indulged in by brokers and furnace companies, has not been characterized by that activity in pig-iron which it was thought the conditions of the market would bring about. One thing, however, furnishes brokers with a good deal of hope and a good deal to talk about, and that is, the number of inquiries for forge iron which have been received during the past few days. These inquiries show what has been known to some for a good while, that stocks are very light in consumers' hands, and that it is only a question of time when they will be obliged to come forward and purchase more or less freely for winter requirements. Large amounts of material are asked for, and numerous offers are made. One broker said yesterday that he had had more inquiry during the past week than for three months previously. Several brokers have negotiations pending for large lots, and expect to close during the coming week. These expectations may not be realized, as buyers show a great deal of caution in placing orders, having the impression that still lower prices are probable. This, however, is positively denied by brokers. It is likely that whatever business is done will be done at $20@$21 for No. 1 Foundry, and $19 for No. 2, though some sales of No. 2 have taken place at less, in cases where quality was not guaranteed. More interest is felt in the business likely to be done in Gray Forge. Prices will be fixed somewhere between $17.50 and $18.50, and probably some inferior makes will sell below $17.50. Quotations show no change. Two or three special makes have been ordered quite freely, and as there is no surplus of stocks, makers' terms are paid.

Foreign Irons.—Quotations are nominally $20@$20.50 for Bessemer, with a little business at the former figure, and a large amount possible at a little less. Spiegeleisen, $29.

Muck Bars.—Very little business is reported at $32 and $32.50 asked, with offers at less.

Blooms.—Quotations are $45@$46.50 for Anthracite, and $56 for Charcoal. Scrap Blooms $42, with one or two makers holding at $42.50.

Merchant Iron.—The middle of January has not developed the promised activity, and hence rates for large lots are a little easier, although the drooping tendency has not been followed by a corresponding activity upon the part of buyers, who are still looking for lower prices, without any reason for doing so. The only thing which can weaken prices below present asking figures is Western competition, and this does not seem probable at present; although, if buyers in the West continue to stay out of the market, Western iron, as usual, will be pushed into Eastern markets. Sales have been made this week at 1·90c. at country mills, and iron not first-class has sold at 1·80c., but 2c. is the nominal selling price in small lots. The market is down to cost for bars, and is likely to stay there. A few mills have started up, but the outlook is not such as to inspire confidence in an early activity.

Nails.—Nail-makers are hopeful that the Western suspension and the Eastern strike will enable them to adhere a little more firmly to asking prices. A few car-load lots have been asked for, but a jobbing demand is the only thing heard of generally, and that

NEW YORK MINING STOCKS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE.												SALES.
	Jan. 12.		Jan. 14.		Jan. 15.		Jan. 16.		Jan. 17.		Jan. 18.		
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alice, Mon.													
Amie Con., Co.	.10				.09								2,100
Argenta, Ne.													
Bar & Walker, Ut.													
Bassick, Co.											7.75		5
Belle Isle, Ne.			.22						.10				350
Bodie Cons., Ca.	5.00	4.00	5.00	4.50	5.25		7.25	5.50	8.25	7.50	12.50	11.00	3,925
Breece, Co.													
Bulwer, Ca.			.53		.60		1.00	.65	1.40	.95	1.75	1.65	5,255
California, Ne.	.08	.07									.11	.09	2,500
Cal. & Hecla, Mich.													
Carbonate Hill													
Caribou Con., Co.	.06												400
Castle Creek			.15										100
Chrysolite, Co.							1.10		1.10		1.15	1.10	1,000
Cons. Va. Ne.	.28	.27			.29		.20		.38	.27	.33		1,780
Crown Point													
Deadwood-Terra, Dk.													
Dunkin, Co.					.22	.20							200
Eureka Cons., Ne.							2.00		1.95		1.75		275
Excelsior, Ca.													
Father de Smet, Dk.													
Findley, Ga.													
Gold Stripe, Ca.	.07												100
Gould & Curry, Ne.													
Grand Prize, Ne.													
Great Eastern, Dk.													
Green Mountain, Ca.	1.95										1.90		800
Hale & Norcross, Ne.									1.85				100
Hall-Anderson, N. S.													
Hibernia, Co.													
Homestake, Dk.													
Horn-Silver, Ut.	6.50		6.63	6.50	6.75				6.88	6.75	6.75		1,250
Hukill, Co													
Independence, Ne.													
Iron Silver, Co.	1.90	1.85	2.00	1.85	2.00		2.15	2.10	2.00		2.10		3,600
La Plata, Co.													
Leadville C., Co.	.45				.49	.45	.49						1,400
Little Chief, Co.			.60		.58		.48	.45			.50	.49	2,300
Little Pittsburg, Co.	.45		.45								.60		700
Martin White, Ne.													
Moose, Co.													
Navajo, Ne.	2.00				2.00		2.25	2.00	2.25		2.25	2.20	800
Northern Belle, Ne.					.50								50
North Belle Isle, Ne.			.20										100
Ontario, Ut.					28.25								35
Ophir, Ne.													
Plumas, Ca.													
Prussian, Colo.													
Quicksilver Pref., Ca.													
" Com., Ca.					5.00	4.50					5.50		300
Rising Sun, Ca.													
Robinson Cons., Co.	.22		.23						.30				1,400
Saint Joseph's Lead.													
Savage, Ne.			.90										100
Sierra Grande, N. M.	.75		.75	.74			85		.80		.85	.80	4,800
Sierra Nevada, Ne.					2.80				2.50		2.70		230
Silver King, Ar.	8.00						8.00		7.25	7.00			385
Spring Valley, Ca.			.9										100
Standard, Ca.	5.75		5.75		6.00	5.50	5 75		6.00	5.75	7.25	6 50	2,550
Stormont, Ut.													
Tip Top, Ar.													
Tombstone, Ar.													
Vizina, Ar.													
Yellow Jacket													

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE.												SALES.
	Jan. 12.		Jan. 14.		Jan. 15.		Jan. 16.		Jan. 17.		Jan. 18		
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alta-Montana												.06	.05	2,600
American Flag														2,800
Barcelona, G	.13						.12			.13				
Bear Creek														
Bechtel Con., G.	.05													100
Belvidere														
Best & B'cher, G. S.														
Big Pittsburg, S. L.														
Bradshaw, S.														
Buckeye														
" pref.														
Bull-Domingo, S.L.														
Bye and Bye														
Calaveras, G														
C'lav'r's W. & M. Co.														
Cal., G.														
Central Aris'na, S.					.20		.20					.20		600
Cherokee, G														
Climax, Co.														
Colorado Central														
Cons. Imperial	.05	.04												200
Crowell, G														
Dahlonega, G												.01		100
Decatur												.03		6,600
Dunderberg												.04		
Durango, G.												.03		1,000
Eastern Oregon	08													500
Elko Cons.														
Enterprise														
Fannie Barret														
Globe Copper														
Gold Placer, G														
Goodshaw, G.					.05		.10		.19		.37	.30	.50	.45	2,800
Granville, G														
Harlem M. & M. Co.					.13		.10		.10	.09			.13		4,000
Hortense, S														
Imperial														
Lacrosse, G					.07							.07	.09		700
Lucerne														
Mariposa Pref., G														
" Com., G														
Mexican, G. S.														
Miner Boy														
Mono														
North Mexican														
North Standard, G.												.18	.13	.23	800
N. Horn-Silv'r, S L.														
Ori'nt'l & Miller, S.														
Parnell														
Rappahannock, G.												.08		.05	1,000
Red Elephant, S.															500
Ruby, of Arizona														
Silver Cliff, S.														
Sonora Con.	.09				.10						.09	.09		.10	.09	6,200
South Bodie, G														
South Bulwer, G.														
South Hite														
South Pacific														
State Line, 1 & 4, S.														
" Nos. 2 & 3, S.														
Sutro Tunnel	.16	.15	.16									.15		.17	.16	3,600
Tioga												.33	.35	.50		1,400
Taylor Plumas														
Unadilla, S														
Union Cons., G. S.			2 45				2.50	2.40					3.50	3.40	450

Full tables giving the total amount of dividends, capital, etc., will be printed the first week of each month. Dividend shares sold, 38,940. Non-dividend shares sold, 35,950.

BOSTON MINING STOCKS.

	Jan. 11.		Jan. 12.		Jan. 14.		Jan. 15.		Jan. 16.		Jan. 17.		Sales
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alloues													
Amie							.09						200
Atlantic													
Atlee													
Bodie Con.													
Bonanza D.											1 5-16	1¼	100
Bowman Sil			.18	.17	.19	.17	.19	.17	.17		.16	.15	8,400
Bruns. Ant.							8.00						25
Bulwer													
California													
Cal. & Hec.			233		234				233½	233			47
Catalpa							.30		.30				2,000
Climax					.09								300
Co. Virginia									.30		.26		300
Content'n't.													
Copper F'lls													
Crescent													
"Cust"													
Decatur													
Deer Isle													
Denver City													
Douglas													
Duncan													
Dunkin													
Elko Con													
Empire					.30		.31	.28	.32	.30	.34	.30	6,250
Eureka Con.													
Franklin	9.88		9.75		9.88	9.75	9.75						92
Gila County													
Hancock G.													
Harshaw	.50												4
Horn-Silver													
Huron									1.25		1.25		300
Independ'ce													
Indian Qeen													
Mammoth													
Mass. & N.M.													
Milton													
National													
North Belle									52½				50
Ontario													
Osceola	17.00						16.50						15
Penn-Breck.													
Pewabic			1.69				1.55	1.50	1.75		1.69	1.50	350
Pine Tree													
Plymouth													
Quincy	47.50		47.50		47.50	47.00	47.00		47.00	46.25	46.00		118
Ridge													
San Pedro													
S'ra Nevada											2.88		25
S'ra Grande													
Silver Islet													
Silver King													
Simpson 6d													
Sonora Con													
South Paci.													
Standard					5.75				6.00				25
Sullivan					82½	.80			.85		.80		1,000
Sutro Tun.			.16		.17		.17						1,000
Sycamore													
Twin Lead.													
Vizina													

PHILADELPHIA MINING STOCKS.

	Jan. 11.		Jan. 12.		Jan. 14.		Jan. 15.		Jan. 16.		Jan. 17.		Sales.
	H.	L.	H.	L	H.	L.	H.	L.	H.	L.	H.	L.	
Amer. Cons.													
Argent	.20	.19	.20		.21		.22	.21	.22		.22		15,600
Arizona So.													
Battle Mt.													
Buena													
California													
Calista													
Chrysolite													
Cincinnati	.11		.12	.11	.12		.11		.11		.11		10,850
Comprom'e.											.35	.34	300
Contention													
Con. Virg.													
Dauntless											.01		7,000
Del Monte												.01	
Denver City	.21										21	.20	.21		1,500
Eureka															
Girard															
Governor					.2		.02		.02		.02		.2		14,500
Grand Uni'n	.06	.05	.04		.05	.04	.06	.05	.07	.05	.06	.05	93,100
Green Mt.															
Gunnison															
Homestake															
Horn Silver															
Iowa Gulch			.04		.03	.02	.04	.03			.03		18,218
Iron Silver															
King Bul'on															
Ledger Con.															
Little Dia'd.															
Little Maud	.04	.03			.03								2,100		
Little Pitts.															
L'g & D'y H															
Montana															
Mt. Sheridan	.03												2,000		
Navajo															
North'n B'l															
Orion															
Orion Pref.															
Palmetto E.															
Pembina															
Penn-Breck.												.04		.04		3,600
Permanent					.01										6,000
Pizarro															
Pizarro Ex.															
Potosi															
Rara Avis															
Rara Avis E.	.05						.06		.06				.06		6,800
Record															
Rico Pion'r															
Sierra Apac.	.17		.19		.24	.22	.23	.22	.23		.23		3,300		
Sierra Be la.	.40	.35	.36				.40	.39	.40	.39	.40		5,800		
Sierra G'nde	.75		.75	.72½					.80				1,100		
Sierra Nev.															
Silver Cord.	1.00		1.00									1.00		2,200	
Silver King															
Silv'r Plume															
Sonora Con.															
Standard															
Sultana	.02													16,000	
Sutro Tun'l.															
Tombstone			.70		.72½				.72½				400		
Victor															
Yale Mt.															

is confined to providing for current requirements. Nominal quotations, $2.45@$2.55.

Plate and Tank Iron.—The movement in plate and tank iron is not of proportions deserving of special comment. Some makers have a fair amount of small orders, and some good business in sight.

Structural Iron.—Quotations are 2·25@2·30c. for Angles; 2·35c. for Bridge-Plates; 2·75c. for Tees; and 3·50c. for Beams and Channels, with concessions of more or less magnitude, according to the size of orders to be secured. Small orders are coming along, and there is some large business which makers expect to secure in a short time.

Sheet-Iron.—Demand is light and prices steady. Best Refined, No. 28, 4¼c. Makers of galvanized are preparing for an active spring trade, and intend to stock up a little more freely than usual. Discounts on Common, 55@60.

Wrought Pipes and Tubes.—A fair amount of business is in sight, but consumers are not disposed to place orders so early in the season.

Steel Rails.—The representatives of the companies here report a fair amount of inquiry, and state that business could be had easily if offers received were accepted, but that present asking prices will not be paid for large lots. A fair amount of small business has been placed. Quotations, $34@$35.

Old Material.—More inquiry than sales. Tees can be had at $22.50. Crop-Ends, $20.50. Cargo Scrap, nominally $22.50. No. 1 Wrought Scrap, $23.50@$24.

Pittsburg. January 17.

[From our Special Correspondent.]

The Western iron trade is weak. Standard Gray Forge is held at $18, with offers at 25 cents less, and buyers are purchasing only for immediate requirements. Very little iron is moving in more than 10 to 50-ton lots, with an occasional 100-ton lot at a concession. A few hundred tons of Charcoal Iron have sold at $27@$29. Anthracite Foundry, $19. Gray Forge, Lake ore, $18@$19. Gray Forge, with native ore, $17@$18. Bar Iron, 1·80@1·90c., nominal quotations. Sales are made at a good deal less. Inquiries are made for large lots of Steel Rails, and offers are at $33@$34; sales of small lots have taken place at $35@$36. The nail trade is quiet; quotations, $2.40@$2.50. A good deal of inquiry is coming to hand, but no large transactions are likely to take place at present. Some of the makers of wrought-iron pipe are doing a good business. Discounts are 30 per cent on Black Butt Weld and 50 on Galvanized. No sales of old rails are reported. Quotations, $23@$24. Track supplies are in active demand at 2·50c. for Spikes and 1·75c. for Bars. Merchant Steel is quiet.

Several of the Cleveland stockholders have petitioned for a dissolution of the Brown & Bonnell Company. The strike of the glass-workers continues, and they are asking aid, with success. The nail men expect the Eastern strike to strengthen their own position materially. A new glass association has been formed at Bellaire, Ohio, composed of the manufacturers of Bridgeport, Martin's Ferry, Brilliant, Steubenville, Wellsburg, and Wheeling.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Jan. 18.

Anthracite.

On the 15th inst., the Pennsylvania Coal Company issued a circular advancing prices, and, as we intimated last week, the market was hardening. As, however, the main argument in favor of higher prices has been the cold weather, those who used it will be forced to look about for some other plausible reason now, unless they do not wish to let the advantage gained go. The market is quiet without any special features.

The annual contract for 3000 tons of broken, 5000 tons egg, and 7000 tons of stove, for the Commissioners of Charities and Corrections has been let at $3.95 alongside.

Bituminous.

There are no points of interest, the market continuing dull with ample supplies and a restricted demand.

Philadelphia. January 17.

[From Our Special Correspondent.]

It will perhaps be a month yet before the coal trade resumes heavy proportions. In the mean time, business will be of a retail character, and only the most pressing requirements will be provided for, for two or three reasons. First. Prices for the smaller sizes have been advanced, which has been a surprise to most of the trade. Secondly. Freights are high. The opinion is, without reason, still clung to by consumers, that the coal combination can not hold together, that circumstances will weaken it, and that dissensions, from one cause or another, will come to the rescue of consumers. These and one or two other reasons may be assigned to account for the fact that demand is not heavy, and will not be for two or three weeks. Prices on certain sizes have been advanced at some outside markets. In this market, however, the advance has been made in a very negative way, namely, all further decline has been cut off. Very near circular prices have been obtained recently, and the downward tendency has been arrested. Before the holidays, a great deal of cutting prevailed; but the restriction has worked a small revolution in the trade, and prices are firm, and likely to remain so until April first. The companies are in better spirits to-day than for several months. There are no signs of weakening, although buyers profess to think otherwise, and there is no necessity for cutting rates, even though the manufacturing demand should be light. The outlook in manufacturing circles is somewhat better. Mills and furnaces are starting up. Inquiries are made for iron, in large and small quantities, and a host of new enterprises are coming to the surface, all of which indicates that the requirements for coal will be as heavy as usual, and probably heavier Representatives of the trade are quietly waiting and watching for demand to come. There are indications that during February a large number of Eastern and Western buyers will be in the market. What is most wanted now is steady prices and regular demand. The line trade is calling for only moderate amounts. In the city, trade is quite active, because of the cold weather. The rough weather during the first three days of the week has been against making a full output last week as well as this, while the latter part of the week has been more favorable. In the language of a prominent operator, "Providence has been on the side of the operators, sending bad weather to increase the restriction."

The Clearfield region is working to about two thirds capacity. The Cumberland output has fallen below half of the usual average. The Broad Top region is not doing as well as usual at this season. The soft coal operators are looking forward to the completion of the Vanderbilt road with a great deal of anxiety. They think that the lower freight rates which will be the outcome will help them to get out of the hole they are now in. The cars ordered by the Pennsylvania Railroad Company will be ready for the spring trade. There is absolutely nothing in bituminous coal, and several operators stated to-day that it was a matter of indifference to them whether they obtained contracts or not.

Pittsburg. January 17.

[From our Special Correspondent.]

It can not be said of the trade at this point that it promises better things than was the case a week or a month ago. This is the season of mid-winter lethargy any how, and the long-continued dullness in iron exerts unusual influences upon the coal-producing industry. Prices keep down to the lowest notch, both in coal and in coke. Mill demand is notably slack, though better than it was a few weeks ago. The encroachments of natural gas retires from the market some of the best customers known to the local trade, and yet there is gas enough going to waste to light up the surrounding hills. Glass (window) factories are idle, as they have been for months, and a minority of the iron mills only are running at their full capacity. All this tends to depress trade, and I find not a single pit on the Monongahela working this week. In the railroad pits, work will average half-time. All that work, with a few exceptions, are paying the umpire's price of 3½ cents per bushel. The exceptions are at Tom's River, Pan-Handle field, and Buena Vista works, on the Baltimore & Ohio road. At the latter, a few miners are working at 3c. The strikers are here pursuing their old "black-sheep" and fife and drum pleasantries to induce the 3-cent men to come out. This resulted yesterday in the arrest of thirteen of the offensive diggers, and a lively hearing in this city on a charge of conspiracy. Ten of the accused were held for court, and bail fixed in $500 each. Then the disturbers of the peace went back to their homes, declaring that they would go to camp and continue to make it pleasant for the "black sheep."

Railroad coal on the wall was boosted by the recent severe cold to 6¼@6½c. It has since fallen to the old figures of 5¾@6c., with a sluggish demand, and no prospect of better things until iron and steel shows a more lively front.

River matters are about dead, with four or five million bushels loaded and afloat, and ice solid along the pools of the Monongahela. Prices at Louisville remain low, with sales at 7¼@7½c. for Second Pool, 6½@6¾c. for Upper Pool lump. Recent disasters to coal along the river have not tended to increase the good humor of river coal shippers, who unite in hoping for a continuance of the present cold weather until far into the spring. The river supply to local consumers is shut off by heavy ice in both rivers and railroad; the demand is somewhat stimulated by the same cause.

Coke shows no feature that it has not worn for six months. The same "fair to middling" demand—say 650 cars out of the region daily—the same prices, $1@$1.25 f. o. b., and the same dearth of prospects of a betterment. Since my last, the Redstone Coke-Works, Southwest Railroad, has dissolved, owing to internal troubles. It comprises 313 ovens and 400 acres of coal. Three trustees have been appointed to wind up the affairs of the company.

Buffalo. January 17.

[From our Special Correspondent.]

The severe weather which has prevailed for several days proved beneficial to the retail traders in coal, and a good business was done. If the cold snap continues, this activity will of course follow suit. The wholesale market was firmer, but it was generally understood that purchases could be made based upon spring opening rates.

Bituminous coal is in fair request and steady at the prevailing low figures.

The coke trade is in fair shape, and the demand up to the average.

Collections are slow. Manufacturers are moving cautiously in all branches of trade.

Stocks of anthracite in Toronto are rumored to be low, as dealers there are making inquiries relative to purchasing in the near future.

The Delaware & Lackawanna wharf, which was formerly known as Central wharf, is rapidly progressing toward completion. An immense warehouse for freight will be erected by the opening of navigation, covering the whole of the company's property between the wharf and railroad tracks. It is doubtful whether the company will buy a line of propellers or charter vessels for the season's business. Time will show.

Some exceptions have been taken to my figures of the receipts and shipments of coal at this port during the past year. As the subject is an interesting one, I would like your readers to know that my statement is indorsed by the *Commercial Advertiser* of this city, the editor of which used my figures in preparing the following article which appeared in its columns yesterday, and which illustrates the coal trade of this city and its adjuncts in an interesting manner. I therefore give your readers the benefit of said article, which is as follows:

A GREAT AND THRIVING INDUSTRY.

We are in receipt of the following communication which explains itself:

MANCHESTER, NEW HAMPSHIRE, January 8, 1884.

Editor Buffalo Commercial:

I desire a review of your Buffalo coal trade for 1883. I want to know what the receipts and shipments were and a guess as to the future of the business. J. A. R.

The *Commercial* is always pleased to impart information concerning Buffalo's business interests and its prospects. As a coal receiving and distributing point, it is ahead of any city west of the Atlantic seaboard, and the amount of coal handled here annually is only exceeded by that handled at New York and Philapelphia. Lying, as it does, at the foot of the great lakes, where immense quantities of grain accumulate every season, insuring plenty of up-lake tonnage, and having direct connection by several competing routes

with the great anthracite and bituminous coal-fields of Pennsylvania, it is favorably located for an indefinite development of the business. The supply of coal in Pennsylvania is almost inexhaustible, while the demand for it at the West is increasing every year. The receipts of coal at this point for three years were as follows:

ANTHRACITE.

	1881.	1882.	1883.
By canal, tons	181,292	233,004	163,042
By rail, tons	1,065,000	1,700,000	1,916,000
Total anthracite, tons	1,246,292	1,933,004	2,079,042

BITUMINOUS.

By lake, tons	7,830	8,880	4,550
By canal, tons	500	.....	500
By rail, tons	988,919	1,089,907	2,084,929
Total bituminous, tons	996,249	1,098,787	2,089,979

ALL KINDS.

Grand total	2,242,541	3,031,791	4,169,021

Large quantities of this coal are consumed in this city, but by far the larger portion of it is forwarded East, West, and North. There is no way of ascertaining the amount shipped hence by rail; but the following exhibit shows the shipments by lake and canal for the year:

ANTHRACITE.

	1881.	1882.	1883.
By lake, tons	825,240	1,011,098	1,248,778

BITUMINOUS.

By lake, tons	30,000	32,000	35,000
By canal, tons	29,222	25,276	23,545
Total bituminous	59,222	57,276	58,545

ALL KINDS.

Grand total, tons	884,462	1,068,374	1,307,323

From these figures, it is seen that the development of the business has been rapid and steady. In 1874, only 445,074 tons of anthracite were shipped West by lake; last year, 1,248,778 were forwarded, showing a gain of over three hundred per cent in seven years. Large as the coal business of Buffalo is at present, it is still in its infancy. The preparations making at this point by the great coal roads for an extension of business can not fail to increase both receipts and shipments several hundred per cent in the near future. All of the large coal companies of the country are represented here by important interests. The Lehigh Valley, as is well known, has an extensive system of improvements under way in the southern part of the city. It is digging four miles of canal that will accommodate vessels drawing 16 feet of water. On the banks of these canals, the company has well advanced a mammoth coal-trestle with a capacity for storing 150,000 tons, and a trestle with 63 pockets holding 5000 tons. When these improvements are completed, the Lehigh will have a capacity for transferring half a million tons annually. It operates a line of six large steamers, with a combined carrying capacity of 10,000 tons, the vessels carrying coal West and grain on the return passage. Additions will soon be made to the fleet.

The Delaware, Lackawanna & Western has extensive trestles near the mouth of Buffalo River, and can load to their fullest capacity vessels of the deepest draught. The trestles have 42 pockets, holding 4500 tons, and the company's annual shipping capacity is 500,000 tons. The Lackawanna has also a line of steamers running in connection with its road, and is in a position to handle coal to the best possible advantage. Arrangements are now making for increasing its facilities.

The New York Central, which has nearly completed, the improvements necessary to connect its lines with the Reading, the greatest coal road in the country has trestles on the Erie basin having 24 pockets of 2460 tons capacity. The Central can ship by lake 200,000 tons a season with its present facilities; but large additions are soon to be made to provide for the increase of trade expected from the Reading. The Buffalo, New York & Philadelphia has good facilities for handling coal. It has a trestle with 38 pockets, holding 4000 tons, and track room for holding 400 twenty-ton cars. This road's yearly shipping capacity by vessel is 200,000 tons. The Delaware & Hudson Canal Company has one trestle with 57 pockets holding 4800 tons, and a dock capable of storing 50,000 tons. Its annual shipping capacity is 250,000 tons. The New York, Lake Erie & Western, which transports much anthracite, handles its coal in connection with the Lehigh Valley Company.

With the present facilities, 2,000,000 tons of anthracite can be shipped by lake each season. When the improvements now in progress are completed, the coal roads will have a combined shipping capacity of about 5,000,000 tons. A notion may be had of the facilities for handling coal at this port and the dispatch that may be given vessels from the following: A vessel of 1500 tons capacity was loaded last season at one of our coal docks in the remarkably short space of two and a half hours. At the same dock, 6000 tons were transferred to vessels in a single day. A large lake steamer can arrive, unload her grain, take a full load of coal, and depart, all in a day.

Chicago. January 16.

[From our Special Correspondent.]

There is very little new and certainly nothing encouraging to report concerning the Western coal market. Whatever good effects were produced by the cold snap seem already to have reached an end, and the trade is in just about the same condition as before. The "spurt" in orders from the country was all right while it lasted, but it was all too short for the shipping trade which now finds itself confronted by the same grave problems as before the opening of the year. Country retailers are buying only as they are compelled to, and their expectations of lower prices in the near future would seem to be tolerably certain of realization. Circular rates are shaded on all sides, and the shrewd buyer has pretty much his own way. We know of sales made the past week at lower prices than at any previous time since September.

The outlook is surely not favorable; for with heavy stocks and continued large receipts, the prospect of carrying over a big surplus begins to stare the wholesalers in the face. The statement of the Secretary of the Anthracite Coal Association of Chicago, published below, shows that over 79,000 tons of anthracite were received by rail during December, and that from May 1st, 1883, to January 1st, 1884, over 186,000 tons were received more than for the same period in 1882. The stocks in hand January 1st were over 80,000 tons larger than those on hand January 1st, 1883. Here are some figures for the Eastern operators—who look upon Chicago as the natural outlet for all the surplus coal not readily marketable in the East—to ponder over. Let them consider that, in addition to this large increase in the receipts at Chicago, as large an increase has been shipped to Milwaukee, which is no longer an inconsiderable element in the situation in the West, but a very important one. Indeed, the Cream City is becoming a very formidable rival to Chicago in the coal trade, for a very large extent of territory in the Northwest. Then there is Duluth, which has received double the amount of coal received in 1882. When one takes all these facts into consideration, some approximate notion of the increasing area of coal-consuming country back of Chicago is obtained.

The local retail trade is moderately active in a small way and the retail list of prices is fairly well maintained.

We quote circular rates as follows:

PER NET TON BY CAR-LOAD.

Grate	$6.29
Egg	6.47
Range	6.74
Chestnut	6.87
Lehigh lump	7.68
Wilkes-Barre lump	6.72
Pittston lump	6.72

The only change noticeable in the market for bituminous coals is a more marked tendency to weakness in some grades which have held their own pretty well during the season past. If any thing, prices are shaded a trifle more all around than at the beginning of the year. The fight in Hocking Valley, and the large amount of that coal which has been sold in consequence, has had its effect upon other grades, which have suffered on account of the low prices. Hocking Valley is selling at $3.60, and ten off in large amounts. From all that I can learn, a renewal of hostilities in this coal would not be entirely unexpected. All is quiet now, but there is a rumbling beneath the surface which may mean further trouble.

Indiana Block is coming forward moderately, and most shippers find no difficulty in keeping up with their orders. A moderate demand is reported for Wilmington and other standard grades of Illinois coals.

We quote prices as follows:

Erie and Brier Hill	$4.75@$5.25
Winifrede	@ 4.50
Pittsburg	3.75@ 4.00
Indiana Block	3.25@ 3.45
" Slack	1.50@ 1.75
" Nut	1.75@ 2.00
Baltimore & Ohio	3.50@ 3.75
Hocking Valley	@ 3.60
Youghiogheny	4.00@ 4.25
Wilmington	2.60@ 2.75
Blossburg	@ 4.15
Cumberland Smithing	@ 4.00
Sonman "	@ 4.00
Kinkaid Lump	3.40@ 3.60
Grape Creek	2.30@ ....
Fountain County	2.35@ 2.50
Clinton Lump	@ 2.30
Streator	2.25@ 2.35
Minonk	@ 2.50
Morris	@ 2.50

A moderate activity is reported in coke, which in a small way seems to hold up remarkably well. Prices are unchanged, Connellsville selling at $5.10, and Crushed Coke at $5.70@$6.

G. W. Meeker, Secretary of the Anthracite Coal Association of Chicago, sends the following statement showing receipts of coal at Chicago, from May 1st, 1883, to January 1st, 1884:

	Tons.
Receipts by rail of anthracite coal from May 1st, 1883, to January 1st, 1884	392,204
Corresponding period, 1882	325,199
Increase, 1883	67,005
Receipts by rail of bituminous coal from May 1st, 1883, to January 1st, 1884	1,668,391
Corresponding period, 1882	1,703,617
Decrease, 1883	35,221
Receipts by lake of anthracite coal from May 1st, 1883, to January 1st, 1884	748,467
Corresponding period, 1882	629,385
Increase, 1883	119,082
Receipts by lake of bituminous coal from May 1st, 1883, to January 1st, 1884	210,860
Corresponding period, 1882	274,908
Decrease, 1883	64,048
Total receipts of anthracite coal by lake and rail from May 1st, 1883, to January 1st, 1884	1,140,671
Corresponding period, 1882	954,584
Increase, 1883	186,087
Total receipts of bituminous coal by lake and rail from May 1st, 1883, to January 1st, 1884	1,879,251
Corresponding period, 1882	1,978,520
Decrease, 1883	99,269
Total receipts of all kinds of coal, including coke, from May 1st, 1883, to January 1st, 1884	2,019,922
Corresponding period, 1882	2,933,104
Increase, 1883	86,818

STOCKS.

Anthracite coal on hand May 1st, 1883	88,749	
Received from May 1st, 1883, to January 1st, 1884	1,140,671	
Total January 1st, 1884		1,229,420
Anthracite coal on hand May 1st, 1882	183,863	
Received from May 1st, 1882, to January 1st, 1883	954,584	
Total January 1st, 1883		1,138,447
Increase, 1883		80,973

RECEIPTS OF ANTHRACITE COAL—LAKE AND RAIL.

	Tons.
January 1st, 1883, to January 1st, 1884	1,241,322
January 1st, 1882, to January 1st, 1883	1,097,014
Increase, 1883	144,308

Boston. January 17.

[From our Special Correspondent.]

The market has improved this week. The weather has been steadily cold; the demand, though yet small, is on the increase; and the firm feeling among jobbers, owing to the decrease of stocks by restriction, has had a good influence on the retail trade. The advance in circular of 25 cents per ton on stove and 10 cents on broken and egg has been well received by jobbers. They believe it will stimulate trade by waking up the retailers, and in fact it has already done so. Parties having orders in are anxious for quick delivery, and there is considerable inquiry from others. Not much buying is done, because jobbers are firm at the new figures of $4.40 for stove and $3 85@$3.95 for broken and egg. It would be easy to sell coal to-day at last week's figures. We can not learn that this is done. The whole market, but more especially the retailers, entered upon the winter with light stocks, and must order to a greater or less extent very soon, if we have steady weather. The anthracite situation at this port is in all respects a healthy one.

But little anthracite is coming along from Phila

delphia nowadays. The Delaware is full of ice, and freights are decidedly in favor of New York. The Philadelphia & Reading Company was firm at actual circular prices of $4.50 for stove before the advance. With the existing difference in freights, it will hardly insist upon the full 25 cents advance. It is selling stove coal from pockets at $6, and has been for some time, while Boston retailers are delivering the same size of coal at $6@$6.25.

The bituminous coal trade is quiet. The Fitchburg road has bought one of its regular 10,000-ton lots, which will last it less than a month at this season of the year. Outside of this transaction, there is nothing doing. The prospect is for low prices and close competition when trade starts or is started. The chances for an increased output of broken coal for steam purposes are not very brilliant.

Freights are a little firmer at all ports, and our inside quotations are the exception. There is a little better demand for vessels, but rates are still below captains' ideas of a fair winter rate. Baltimore and Philadelphia are troubled by the floating ice. Newport News is somewhat the gainer for this. We quote :

New York, $1.10@$1.25 per ton ; Philadelphia, $1.50@$1.60 ; Baltimore, $1.60@$1.70 ; Georgetown, $1.70@$1.75 ; Newport News, $1.65 ; Richmond, $1.70 ; Bay of Fundy, $1.60@$1.65 ; Cape Breton, $2.25.

Retail trade is good, and the advance at wholesale, if maintained, must cause a corresponding retail advance, and there is no leeway for an advance at present prices. It is undoubtedly a good time for the small consumer to lay in a supply for the rest of the winter. We quote :

White ash, furnace, egg, and nut	$5.75
" " stove	6.00@6.25
Red ash, egg	6.25
" " stove	6.50
Lorberry, egg and stove	6.50@6.75
Franklin, egg and stove	7.00
Lehigh, furnace, egg, and stove	6.00@6.25
"	6.00

STATISTICS OF COAL PRODUCTION.

Comparative statement of the production of anthracite coal for the week ended January 12th, and year from January 1st :

TONS OF 2240 LBS.	1884.		1883.	
	Week.	Year.	Week.	Year.
Wyoming Region.				
D. & H. Canal Co.	43,864	51,264	84,967	142,698
D. L. & W. RR. Co.	59,620	117,870	84,366	164,411
Penna. Coal Co.	13,481	20,011	27,385	49,495
L. V. RR. Co.	13,978	31,142	34,724	51,673
P. & N. Y. RR. Co.	2,869	6,264	3,887	6,989
C. RR. of N. J.				
North & West Br. RR.		*	45,993	73,399
		13,028		
	133,812	239,579	281,322	488,665
Lehigh Region.				
L. V. RR. Co.	54,057	107,979	93,324	176,172
C. RR. of N. J.		*	44,885	69,400
S. H. & W. B. RR.		425	726	726
	54,057	108,404	138,935	246,298
Schuylkill Region.				
P. & R. RR. Co.	119,352	239,340	128,860	218,176
Shamokin & Lykens Val.		*	19,474	35,237
	119,352	239,340	148,334	253,413
Sullivan Region.				
St Line&Sul.RR.Co.	1,480	2,397	1,493	2,417
Total	308,701	589,720	570,084	990,793
Increase		*		
Decrease		401,073		

* Included in tonnage of the Philadelphia & Reading Railroad.

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Total same time in 1879	650,273 tons.
" " " " 1880	838,679 "
" " " " 1881	638,560 "
" " " " 1882	956,094 "

Belvidere-Delaware Railroad Report for the week ended January 12th :

	Week.	Year. 1884.	Year 1883.
Coal for shipment at Coal Port (Trenton)			125
Coal for shipment at South Amboy	4,902	12,165	34,063
Coal for distribution	11,273	20,912	31,956
Coal for company's use	4,268	8,297	6,364
Total	20,443	41,374	72,508
Increase			
Decrease		31,134	

The decrease in shipments of Cumberland Coal over the Cumberland Branch and Cumberland & Pennsylvania railroads amounts to 13,063 tons, as compared with the corresponding period in 1883.

The Production of Bituminous Coal for the week ended January 12th was as follows :

Tons of 2000 pounds, unless otherwise designated.

	Week. Tons.	Year. Tons.
Cumberland Region, Md.		
Tons of 2240 lbs	27,674	50,061
Barclay Region, Pa.		
Barclay RR., tons of 2240 lbs.	4,191	12,456
Broad Top Region, Pa.		
Huntington & Broad Top RR., of 2240 lbs	2,889	5,538
East Broad Top		
Clearfield Region, Pa.		
Snow Shoe	4,679	8,166
Tyrone and Clearfield	46,435	84,431
Alleghany Region, Pa.		
Gallitzen & Mountain	7,559	17,776
Pittsburg Region, Pa.		
West Penn RR.	10,484	14,277
Southwest Penn. RR.	2,770	4,704
Pennsylvania RR.	3,703	8,185
Westmoreland Region, Pa.		
Pennsylvania RR	19,780	47,180
Monongahela Region, Pa.		
Pennsylvania RR.	2,047	4,080
Total	132,211	256,854

* Reports not received.

The Transportation of Coke over the Pennsylvania Railroad for the week ended January 12th, and year from January 1st :

Tons of 2000 pounds.	Week.	Year.
Gallitzen & Mountain (Alleghany Region)	1,949	4,265
West Penn. RR	4,518	7,247
Southwest Penn. RR	32,214	65,283
Penn. & Westmoreland Region, Pa. RR.	3,431	6,878
Monongahela, Penn. RR.	1,360	2,701
Snow Shoe (Clearfield Region)	466	906
Total	43,938	87,280

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